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CETHA-BC-CR-90113

AD-A227 897

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U.S. Army Toxic and Hazardous Materials Agency

Report of Sampling and Analysis Results

Worth Army Housing Units
Worth, Illinois

August 1990

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Prepared for:

U.S. ARMY TOXIC AND
HAZARDOUS MATERIALS AGENCY
Aberdeen Proving Ground
Maryland 21010-5401

Prepared by:

WESTON
MANUFACTURERS DESIGNERS CONSULTANTS

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Argonne National Laboratory
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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-01881a. REPORT SECURITY CLASSIFICATION
UNCLASSIFIED

1b. RESTRICTIVE MARKINGS

2a. SECURITY CLASSIFICATION AUTHORITY

3. DISTRIBUTION / AVAILABILITY OF REPORT

2b. DECLASSIFICATION / DOWNGRADING SCHEDULE

Distribution Unlimited

4. PERFORMING ORGANIZATION REPORT NUMBER(S)

5. MONITORING ORGANIZATION REPORT NUMBER(S)

CETHA-BC-CR-90113

6a. NAME OF PERFORMING ORGANIZATION

ROY F. WESTON, INC.

6b. OFFICE SYMBOL
(if applicable)7a. NAME OF MONITORING ORGANIZATION Environmental
Assessment & Information Sciences Division
Argonne National Laboratory (for USATHAMA)

6c. ADDRESS (City, State, and ZIP Code)

Roy F. Weston, Inc.
Weston Way
West Chester, PA 19380

7b. ADDRESS (City, State, and ZIP Code)

Argonne National Laboratory
9700 S. Cass Avenue
Argonne, IL 604398a. NAME OF FUNDING / SPONSORING
ORGANIZATION U.S. Army Toxic &
Hazardous Materials Agency8b. OFFICE SYMBOL
(if applicable)
CETHA-BC9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
U.S. Department of Energy Contract
W-31-109-ENG-38

8c. ADDRESS (City, State, and ZIP Code)

U.S. Toxic & Hazardous Materials Agency
Attn: CETHA-BC
Aberdeen Proving Ground, MD 21010-5401

10. SOURCE OF FUNDING NUMBERS

PROGRAM
ELEMENT NO.PROJECT
NO.TASK
NO.WORK UNIT
ACCESSION NO.

11. TITLE (Include Security Classification) UNCLASSIFIED

Report of Sampling and Analysis Results: Worth Army Housing Units
Worth, Illinois

12. PERSONAL AUTHOR(S)

13a. TYPE OF REPORT

Final

13b. TIME COVERED

FROM _____ TO _____

14. DATE OF REPORT (Year, Month, Day)

August 1990

15. PAGE COUNT

16. SUPPLEMENTARY NOTATION

Prepared for the U.S. Army Toxic & Hazardous Materials Agency by Roy F. Weston
under a contract from, and the supervision of Argonne National Laboratory

17. COSATI CODES

FIELD

GROUP

SUB-GROUP

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Roy F. Weston, Inc. has conducted a sampling and analysis program of the Army housing property located in Worth, Illinois. The objectives of this sampling and analysis effort include further characterization of environmental contamination identified in an enhanced preliminary assessment carried out in 1989. The specific activities performed at this site were identification, evaluation of the condition, and collection of samples from specific suspected asbestos-containing materials, including floor tiles, pipe run and pipe fitting insulation, dust in the ductwork, and exterior siding, where present. These evaluations were necessary to clarify potential environmental issues identified in the earlier report, prior to the sale or realignment of the property.

20. DISTRIBUTION / AVAILABILITY OF ABSTRACT

☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS21. ABSTRACT SECURITY CLASSIFICATION
UNCLASSIFIED

22a. NAME OF RESPONSIBLE INDIVIDUAL

Joseph Ricci

22b. TELEPHONE (Include Area Code)

(301) 671-3461

22c. OFFICE SYMBOL

CETHA-BC

**SAMPLING AND ANALYSIS AT THE U.S. ARMY
FAMILY HOUSING UNIT (FHU) PROPERTY
WORTH, ILLINOIS**

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DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
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Distribution/	
Availability Codon	
Dist	Avail and/or Special
A-1	

EXECUTIVE SUMMARY

The U.S. Army family housing units (FHUs) at Worth, Illinois were inspected by Roy F. Weston, Inc. (WESTON) personnel during February 1990 to further evaluate the environmental concerns identified in the enhanced Preliminary Assessment reports prepared and submitted earlier by Argonne National Laboratory (ANL) for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). Three of the 12 single-family "Capehart" housing units were examined on 28 February to investigate the possible presence of asbestos-containing materials (ACM). Transformers were inspected and sampled where possible on 20 March 1990. An assessment of airborne asbestos exposure was performed at one unit on this property on 25 April 1990 by a WESTON Certified Industrial Hygienist (CIH), because asbestos fibers were detected in the dust deposited within the ductwork of the heating system.

The ANL Draft Sampling and Analysis Plan, Revision 1 (SAP) specified identifying and sampling of the following materials, that frequently are suspected to contain asbestos, from ten per cent of the housing units or a minimum of three, whichever is greater.

- Pipe run insulation.
- Dust accumulated inside heating ductwork within the concrete slab, where present and open.
- Vinyl floor tiles.

The WESTON personnel selected three housing units for inspection after review of maintenance records and drawings, discussions with housing management personnel, and determination that all the units were in similar condition. The housing units chosen, Nos. 003, 004, and 009, were considered to be representative of the other nine units, but this was not confirmed by an examination of all units.

Twelve samples of dust and four samples of floor tile were collected by WESTON from the three units and analyzed. These analyses revealed that asbestos is present in dust accumulated within the heating ductwork and in vinyl floor tiles at the three housing units examined. Asbestos was found in six of the twelve dust samples by transmission electron microscopy (TEM), and in samples from each unit. Asbestos was quantified at less than 1% by polarized light microscopy (PLM) in two samples of the floor tile and at 15% in one sample. Asbestos was qualitatively identified by TEM in one other sample of floor tile. No pipe insulation samples were collected since the pipes in the units examined were not insulated. During the asbestos sampling activity, other suspect materials observed were roofing materials.

The following practices should be observed with regard to the known and suspected asbestos-containing materials identified:

- The risks posed by the asbestos-containing dust in the ductwork cannot be clearly evaluated, because the sampling and analysis program only included a qualitative screening of this material since no approved quantitative procedures exist. Further studies, such as air sampling, were recommended to determine if the asbestos is becoming airborne and to define what risks, if any, are presented by these findings. These studies were subsequently performed and the findings are presented in this report.

- The vinyl floor tiles pose no significant risk as long as they are in good condition and are not damaged by excessive wear or misuse. The materials should be left in place and managed under an Operations and Maintenance (O&M) program which describes procedures for the regular inspection of the floor tiles and the removal and replacement of any that become damaged.
- Other suspect materials identified but not sampled, including roofing materials, should be assumed to contain asbestos and managed in place under an O&M program until they are either removed or determined to contain no asbestos.

Samples for airborne asbestos were collected on filters from four floor vents, one located in each of the living room, kitchen, bedroom, and bathroom, in an unoccupied unit which had not been inspected previously. As a consequence, four samples of dust were also collected, using the same procedures as employed previously. The air samples were subjected to analysis by TEM to identify and quantify any asbestos fibers collected. There were no asbestos fibers found in any sample from this facility, indicating that there is no health risk at this site due to the asbestos in the ductwork. The qualitative TEM analysis of the four dust samples revealed that the chrysotile form of asbestos was present in dust taken from three of the four ducts.

Five Army-owned oil-filled transformers were found at the site. Sampling of two units was performed by the WESTON field team, using a bucket truck. These units were in good condition and were determined to be "non-PCB" transformers, as defined in the regulations. Examination of the other three units revealed that they were much older and the outer transformer housings were badly rusted and discolored. Sampling of these units was not attempted, due to the deteriorated condition of the housing.

The three transformers not sampled are Standard Transformer Company 37.5 or 50 KVA units, thought to be about 30 years old. They were manufactured at a time when PCB-containing insulating oils were in near universal use, and should be assumed to contain PCBs. The transformers should be labeled with the fact that they probably contain PCBs. When the transformers are removed and replaced, they should be transported to a location where spills that may occur during sampling of the oils can easily be contained and corrected and facility records should be so noted. The transformers and oils must be disposed of after removal according to applicable regulations, after the PCB content of the oils is determined.

SECTION 1. INTRODUCTION

**SAMPLING AND ANALYSIS AT THE U.S. ARMY
FAMILY HOUSING UNIT (FHU) PROPERTY
WORTH, ILLINOIS**

SECTION 1. INTRODUCTION

Roy F. Weston, Inc. (WESTON) was retained by Argonne National Laboratory (ANL) to provide assistance in gathering additional environmental data for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) at 53 family housing unit (FHU) properties in 12 states. The Worth, Illinois property is one of these FHUs.

1.1 PURPOSE AND SCOPE

The purpose of this project was to provide the Department of the Army with sound environmental data on the property which is scheduled for sale or realignment as a result of the Defense Authorization Amendments and Base Closure and Realignment Act (Public Law 100-526). Environmental assessments of each property covered by the Act are required by the Secretary of Defense prior to their closure or realignment. Such actions must be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA) to ensure that any environmental hazards will be identified and mitigated where required.

Previously, ANL conducted enhanced preliminary assessments (PAs) for each property. These enhanced PAs made recommendations regarding sampling and analysis to determine (1) whether and in what quantities asbestos is present in certain building construction materials (including pipe run insulation, dust accumulated in heating ductwork, vinyl floor tile, and exterior siding shingles, where present), (2) in selected contexts, whether and in what concentration soils and groundwater may be contaminated, and (3) whether and in what range transformer oils at selected sites may contain polychlorinated biphenyls (PCBs). WESTON gathered this data by implementing ANL's Draft FHU Sampling and Analysis Plan, Revision 1 (SAP). Subsequent to the initial studies, WESTON, ANL, and USATHAMA decided that a follow-up effort was required to determine if asbestos fibers were becoming airborne from the dust accumulated inside the heating system ductwork. This study was implemented and samples were collected to evaluate any risks to occupants from this source.

1.2 SITE DESCRIPTION

The Department of the Army's FHU property in Worth, Illinois consists of 12 single-family units located on 7.4 acres. The areas surrounding these FHU are residential properties.

The units are two- and three-bedroom, single-family dwellings built in 1958, in the "Capehart" style. The single-story, wood-frame units were constructed on concrete slab foundations with no basements or crawl spaces. The ducts for the original heating system are embedded in the concrete slab, which was covered with vinyl floor tile. The units have pitched roofs surfaced with asphalt shingles and exteriors finished with vinyl siding.

1.3 REPORT ORGANIZATION

This report contains the results of the sampling and analysis program performed by WESTON. Section 2 contains a description of the asbestos activities performed at the property and laboratory results for samples of suspected asbestos-containing material (ACM) collected. Copies of field notes and laboratory results are provided in Appendices A.1 and A.2. Section 3 presents a description of the field sampling activities and results of the analyses for airborne asbestos fibers. Field notes and copies of the laboratory reports for this effort are presented in Appendices B.1 and B.2, respectively. Section 4 contains a description of field activities and the findings from the transformer evaluations. Copies of field notes and supporting data for this effort are included in Appendix C. Section 5 is a summation of all activities and findings for the Worth FHU.

SECTION 2. ASBESTOS-CONTAINING MATERIALS

SECTION 2. ASBESTOS-CONTAINING MATERIALS

WESTON personnel inspected three of the 12 "Capehart" units at the Worth family housing facility on 28 February 1990 for the presence of suspected ACM. Dust accumulated within heating ductwork and vinyl floor tile were the only suspect materials found within the buildings that were sampled. All sampling was done following the requirements of ANL's SAP. Additionally, all field work was performed in accordance with applicable Federal regulations, including 40 CFR Part 61 subpart M, 40 CFR Part 763 subpart E, and 29 CFR Part 1910.1001.

2.1 SAMPLING RATIONALE

The sampling rationale used by WESTON for this project followed the recommendations set forth by ANL. The type of suspect ACM to be sampled, the number of housing units to be examined at each FHU facility, and number of samples to be taken for each material found were described in the SAP. The plan for Worth required sampling of the following materials, if present:

- Pipe run insulation.
- Accumulated dust inside heating ductwork if not sealed.
- Vinyl floor tiles.

In accordance with the SAP, three units were examined at this facility. The sampling plan, however, did not identify specific units which were to be sampled. The task of determining which housing units were representative of the facility as a whole and, therefore, would be sampled was left to the discretion of the WESTON field team. After reviewing all available maintenance records and drawings and discussing the facility with Directorate of Engineering and Housing (DEH) personnel, it was determined that all of the units at the Worth FHU were similar in condition. Units 003, 004, and 009 were chosen by the WESTON field team leader as representative units to be sampled, based on accessibility at the time of the study. Only three-bedroom units were examined at this facility.

The SAP specifies that a minimum of two pipe run insulation samples, four dust samples, and one sample of each color of floor tile be collected from each of the housing units examined. Twelve dust samples and four samples of vinyl floor tiles were collected at the facility. No pipe insulation samples were collected since the pipes in the units examined were not insulated.

2.2 FIELD ACTIVITIES AND OBSERVATIONS

Each of the units was inspected to determine if suspect materials were present. Samples of the dust in the ductwork were collected by wiping the inner surface of the duct near the designated exhaust vents with a fiber-free wipe selected for its ability to trap dust in a non-fibrous matrix. Each wipe was placed in the jaws of a flexible small parts pick-up tool and moistened with fiber free water. If grille openings were too small, the grille was removed and the tool inserted into the duct opening. The interior surface was wiped to collect dust on the moistened surface of the wipe. After the dust was gathered, the wipe was placed in a small plastic wide-mouth jar, sealed, labeled with the sample number, and shipped to the lab. The grille was then replaced and the tool was cleaned by rinsing and wet wiping the surfaces prior to collecting the next sample. Samples were collected from the living room, kitchen, bedroom, and main bathroom in all three units.

Unit 009 contained brown 12" x 12" and black 9" x 9" floor tile, while units 003 and 004 contained white 12" x 12" floor tile. One sample was taken of each of the floor tiles found in each housing unit, producing a total of four samples for laboratory determination of asbestos content. These samples were collected by breaking off a small piece of floor tile in an inconspicuous location. About one square inch of the tile surface area was taken for each sample. No effort was made to separate the mastic, which sometimes contains asbestos, from the floor tile samples themselves.

The vinyl floor tiles in all three of the units inspected were in good condition. This material is considered to be a non-friable type of ACM, unless damaged. If significant damage occurs, such that the material becomes friable as defined in the asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP), the Environmental Protection Agency (EPA) would classify these tiles as friable materials. However, an EPA opinion was recently released that changes certain previous interpretations regarding non-friable ACM. On 23 February 1990, a memorandum was issued by the Director of Emissions Standards Division, the Director of Stationary Source Compliance Division, and the Associate Enforcement Counsel for Air Enforcement of the EPA Office of Air Quality Planning and Standards (OAQPS). This memorandum was circulated to other air quality officials and EPA regional offices in early March 1990. This latest position states that floor tiles and certain other non-friable materials do not have to be removed from a facility prior to demolition, unless they are severely damaged and thus are considered friable, or unless the demolition may cause fiber release through grinding or abrasion of the tiles. Floor tile removal shall be done if demolition is to be accomplished by burning, either of the unit or of the debris from demolition. However, if the floors in the housing units are to be renovated, special care must be taken during the process to prevent the release of asbestos fibers.

The WESTON field team was directed, as a part of the project scope specified in the SAP, to perform sampling and analysis of specific suspected ACM. Other suspect materials observed were roofing shingles and felt. Copies of the field notes are included in Appendix A.1.

2.3 LABORATORY PROCEDURES AND RESULTS

The bulk samples of building materials were analyzed for asbestos content by WESTON's optical microscopy laboratory in Auburn, Alabama. This laboratory is accredited by the American Industrial Hygiene Association (AIHA) and the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). The bulk samples were analyzed by Polarized Light Microscopy (PLM) using the EPA's "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M4-82-020, December 1982. Copies of the laboratory reports are included in Appendix A.2.

Vinyl floor tile samples for which no asbestos was found using PLM methods and wipe samples of dust accumulated within heating ductwork were analyzed qualitatively for the presence of asbestos by Transmission Electron Microscopy (TEM) at WESTON's NVLAP accredited electron microscopy laboratory in Auburn, Alabama. Copies of these laboratory reports are also included in Appendix A.2.

All analyses were performed in accordance with protocols set forth in the Laboratory Accreditation package submitted by WESTON under NVLAP. This document includes standard procedures for sample analysis and quality assurance/quality control (QA/QC) which were acceptable to NIST. The QA/QC protocols for the laboratory differ significantly from those commonly found in chemical analysis procedures, due to the

nature of the analytical procedure. Since there are no reagents, digestions, or other steps in the process that provide significant opportunities for sample contamination or analyte loss, lot blanks and sample spikes are not performed. Instead, all analyses are performed using the following steps:

- Incoming samples are divided into lots of ten for analysis.
- One sample is selected at random to serve as the QC check and divided into two containers.
- The sample lot is assigned to an analyst who determines the asbestos content of each sample.
- The QC sample is analyzed by a different analyst, designated by the sample custodian.
- The results of both analysts are submitted to the QC Coordinator for review, and comparison to the laboratory QC chart.
- The results are reviewed and approved, based on the written QC review procedures, or rejected. If rejected, the sample lot and QC sample are reanalyzed.

The WESTON laboratory routinely runs blank checks to ensure that equipment and refractive index oils are not contaminated, collects and analyzes samples of the air in the work areas to document that airborne asbestos fibers do not threaten worker health or contaminate samples, and analyzes samples submitted by NIST to document precision of results as required by the NVLAP program. Samples provided in past rounds of proficiency checks are used for analyst training and to document analyst proficiency. The use of third party laboratory comparisons is often done, and is accomplished by sending duplicates of samples to an outside laboratory and comparing the results obtained by the two facilities.

In interpreting the asbestos results, it should be noted that the definition of asbestos presence differs between the EPA and some state agencies. According to the EPA definition, any materials that contain greater than one per cent (>1%) asbestos are classified as ACM by the 1977 NESHAP regulations. However, California has recently implemented state regulations that consider all materials containing 0.1 per cent or more asbestos as asbestos-containing. It is believed that several other states will soon follow the lead of California in lowering the threshold limit to 0.1 per cent, including some in which properties under review in this study are located. Currently, the State of Illinois continues to abide by the EPA definition. Hence, all samples containing >1% asbestos are considered to be ACM.

The matter is further complicated by the fact that the PLM method was developed specifically for friable materials, but not for non-friable types of suspect ACM such as vinyl floor tiles, vinyl sheeting, and siding. In fact, no specific method has been developed and promulgated to date for such samples, so laboratories use PLM as the only available documented procedure for their analysis. PLM has an inherent limitation on fiber resolution of about 0.25 micrometer (um) in diameter while reliable detection and quantification of fibers smaller than 1 um in diameter is difficult. The manufacturing process for vinyl floor tiles, for example, often produces the very small fiber diameters which cannot be seen by PLM. WESTON's experience is that frequently such samples do, in fact, contain significant quantities of asbestos. WESTON has developed a qualitative technique using TEM to detect the presence of such small fibers and minimize false negatives in the laboratory results. This technique, however, does not allow a good quantitative estimate of asbestos content.

For these reasons, the WESTON laboratories have implemented a policy of reporting asbestos presence as follows:

- Asbestos determined by PLM to be present at greater than 1% is reported as the quantity detected.
- If asbestos is estimated to be less than 1% by PLM, it is reported as <1%. This estimate of asbestos content may be made when only one asbestos structure is observed.
- If asbestos is not detected in certain non-friable materials by PLM, then the samples are subjected to TEM analysis. The results are reported as positive if asbestos is detected by TEM.

Recommendations made in this report are based on the >1% regulatory limit, except for floor tiles as discussed earlier and except as otherwise noted. However, all samples in which asbestos is observed are discussed. This represents a conservative approach to the assessment of asbestos presence at the facility.

Table 2.1 contains a summary of all samples collected at the Worth FHU, including sample locations, material descriptions, and laboratory results. PLM results are quantitative while TEM results are qualitative. Quantity estimates for materials sampled that were suspected to contain asbestos are presented in Table 2.2. The field notes describing the observations are provided in Appendix A.1, while copies of the original laboratory reports are included as Appendix A.2.

One floor tile sample was found by PLM to contain 15% asbestos. Two other samples were found by PLM to contain asbestos at a concentration of <1%. One of the samples, for which no asbestos was reported following PLM analysis, was found to contain asbestos fibers by the TEM procedure. While these results are qualitative in nature, consideration of the process through which floor coverings were manufactured leads to the conclusion that these materials should be treated as ACM. Thus, all four samples were found to contain asbestos. The nine units not inspected should be considered to have ACM present in the floor coverings unless additional sampling and analysis is performed and shows that no asbestos is present in these units.

Analytical results for the dust samples taken from the heater ductwork indicate that this dust contains some asbestos fibers. Qualitative TEM analysis revealed the presence of asbestos in six of the 12 samples collected. At least one sample from each unit contained asbestos fibers. This data leads to the conclusion that asbestos is found in the dust trapped by the heating ducts.

2.4 CONCLUSIONS AND RECOMMENDATIONS

The sample analyses performed by WESTON have revealed that asbestos is present in dust accumulated within the heating ductwork and in the floor tile in the three units examined. These units are thought to be representative of the other nine at the site, but this was not confirmed by sampling all the units.

The asbestos dust accumulated within the heating ductwork represents an unusual problem, since the source of this asbestos is not readily apparent, and the quantity is not precisely known. As a conservative

TABLE 2.1
BULK SAMPLE SUMMARY
WORTH FAMILY HOUSING

SAMPLE IDENTIFICATION	MATERIAL TYPE	LOCATION	ASBESTOS CONTENT PLM ANALYSIS	CONFIRMATION TEM ANALYSIS
=====				
Unit 003				

BU228-53-IL-003-AFT	White 12" x 12" floor tile	All rooms	None Detected	Positive
BU229-53-IL-003-ATD	Dust within ductwork	Bath	---	Positive
BU230-53-IL-003-ATD	Dust within ductwork	Bedroom 2	---	Positive
BU231-53-IL-003-ATD	Dust within ductwork	Kitchen	---	Negative
BU232-53-IL-003-ATD	Dust within ductwork	Living room	---	Positive
Unit 004				

BU233-53-IL-004-AFT	White 12" x 12" floor tile	All rooms	Chrysotile, <1%	
BU234-53-IL-004-ATD	Dust within ductwork	Living room	---	Positive
BU235-53-IL-004-ATD	Dust within ductwork	Kitchen	---	Negative
BU236-53-IL-004-ATD	Dust within ductwork	Bath	---	Positive
BU237-53-IL-004-ATD	Dust within ductwork	Bedroom 3	---	Negative
Unit 009				

BU238-53-IL-009-AFT	Black 9" x 9" floor tile	Stor 2	Chrysotile, 15%	
BU239-53-IL-009-ATD	Dust within ductwork	Bedroom 2	---	Positive
BU240-53-IL-009-ATD	Dust within ductwork	Bath	---	Negative
BU241-53-IL-009-ATD	Dust within ductwork	Living room	---	Negative
BU242-53-IL-009-ATD	Dust within ductwork	Kitchen	---	Negative
BU243-53-IL-009-AFT	Brown 12" x 12" floor tile	All bedrooms/Kitchen/ Living room/Hall/Stor 1	Chrysotile, <1%	

TABLE 2.2
ASBESTOS CONTAINING MATERIALS
WORTH FAMILY HOUSING

SAMPLE IDENTIFICATION	MATERIAL TYPE	LOCATION	QUANTITY	UNITS
=====				
Unit 003 -----				
BU228-53-IL-003-AFT	White 12" x 12" floor tile	All rooms	1030	Square ft
BU229-53-IL-003-ATD	Dust within ductwork	Bath	N/A	
BU230-53-IL-003-ATD	Dust within ductwork	Bedroom 2	N/A	
BU232-53-IL-003-ATD	Dust within ductwork	Living room	N/A	
Unit 004 -----				
BU233-53-IL-004-AFT	White 12" x 12" floor tile	All rooms	1030	Square ft
BU234-53-IL-004-ATD	Dust within ductwork	Living room	N/A	
BU236-53-IL-004-ATD	Dust within ductwork	Bath	N/A	
Unit 009 -----				
BU238-53-IL-009-AFT	Black 9" x 9" floor tile	Stor 2	25	Square ft
BU239-53-IL-009-ATD	Dust within ductwork	Bedroom 2	N/A	
BU243-53-IL-009-AFT	Brown 12" x 12" floor tile	All bedrooms/Kitchen/ Living room/Hall/Stor 1	1005	Square ft

approach, the heating ductwork located within the concrete slab should be cleaned or permanently sealed when the units are renovated. Since the heating systems are currently operational, sealing the floor vents will require replacement with attic ducts and ceiling vents, or provision of an alternate heating source. If the ducts are cleaned, a high-powered vacuum cleaner equipped with a high-efficiency particulate air (HEPA) filter should be employed, since other vacuum cleaners are not capable of trapping all of the small asbestos fibers that may be present.

The source of the asbestos in the ducts cannot be positively determined, due to the sampling and analysis procedures employed. However, there are several potential sources, based on observations at the numerous facilities inspected during this project. Units, presumed to be the original heaters, found at other facilities frequently contained an expansion joint which served to isolate the return air plenum from the heater itself, preventing the transmission of vibrations and noise to the ductwork. The fabric-like material used to form this joint was determined, in some cases, to be chrysotile asbestos in a nearly pure form. It is possible, even likely, that the heating systems in these units had similar expansion joints which have been removed. During the 25 to 30 years that the original units were in service, erosion of these joints was likely, and could have caused asbestos fibers to accumulate in the dust.

Another possibility is that residual debris from the removal of vinyl-asbestos floor tiles, such as was found in other sites, may have been left in the ducts during floor tile removal and replacement. Conversations with the TEM analysts indicate that there was some evidence of chlorine observed during the identification of the asbestos fibers by X-ray dispersion analysis in samples from some sites. The most likely source of this element, considering the site history, is the vinyl chloride polymer which forms the floor tile matrix. However, other asbestos sources, such as debris imported into the facilities from outside activities of the occupants, cannot be ruled out.

The vinyl floor tiles in the three housing units inspected were in good condition, but, should they become broken or damaged, asbestos fibers may be released. The recent EPA clarification of the definition for damaged non-friable materials apparently removes some concerns about the status of these materials at the time of renovation or demolition. Inspection of these normally non-friable materials prior to demolition is required, but, if they are in good condition at the time, they may be left in place, as long as planned demolition procedures will not release a significant amount of asbestos fibers. However, if demolition will subject these non-friable materials to grinding, sanding, or abrading, or if demolition involves burning of the structure or debris from the structure, all forms of ACM, including these floor coverings, must be removed in advance.

The vinyl floor coverings should be left in place and managed under an O&M program. An O&M program must address the following:

- The locations of all known and suspected ACM.
- The procedures and frequency for periodically assessing the ACM in the facility.
- The procedures for safely handling the ACM during maintenance or removal activities.
- Designation of an asbestos coordinator for the facility.

- The responsibilities and requirements for training of personnel involved with maintenance and renovation of the facility.
- The record-keeping program for the facility.

The vinyl floor tiles should be removed during a planned renovation of the units, in accordance with the regulations applicable at the time.

Other suspect materials noted were roofing shingles and felt, which should be managed under an O&M program. Care should be taken during renovations or demolition to identify suspect materials that may have been hidden from the view of the assessment team. The suspect materials observed by the field team, and any hidden suspect materials found later, should be analyzed for the presence of asbestos prior to being disturbed.

SECTION 3. AIRBORNE ASBESTOS ASSESSMENT

SECTION 3. AIRBORNE ASBESTOS ASSESSMENT

Sampling for airborne asbestos fibers was performed at one unit of the Worth, Illinois FHU on 25 April 1990 by WESTON. Dr. Leonard Nelms, a Certified Industrial Hygienist (CIH) visited the site and collected the samples using procedures described in the Asbestos Hazard Emergency Response Act (AHERA). These procedures were designed for verifying that clean-up of a contained area, following completion of an asbestos abatement action in public schools, was adequately performed. All samples were analyzed by TEM following the protocols specified in AHERA.

3.1 SAMPLING RATIONALE

WESTON followed the procedures and guidelines set forth during discussions among ANL, USATHAMA, and WESTON staff members, to provide a fast-track field sampling program and rapid analysis of samples collected. The urgency of this effort was driven by the finding that asbestos fibers were a component of the dust contained in the sub-slab ductwork of a number of the installations. The approach chosen required that the WESTON CIH collect four samples of air from selected heating registers, generally from one in each of the living room, kitchen, bedroom, and bathroom. Air samples were to be collected in one unoccupied unit at the site while the heating system was operating, to simulate the worst possible case for exposure of occupants. The vacant unit selected was to be one of those from which dust within ducts had been sampled during the initial investigations, where possible. If no unit that had been sampled previously was vacant at the time, another unit was to be chosen from among those available, and samples of dust from the ducts were to be collected. These samples were to be collected after completion of sampling for airborne fibers, using the procedures employed previously. Unit 08 was selected at the Worth site, since it was the only vacant unit, but it had not been sampled previously.

3.2 FIELD ACTIVITIES AND OBSERVATIONS

The sampling activities at this site were performed during the late morning and afternoon, on a hot spring day. The diaphragm pumps were unpacked, placed in the selected sampling locations, and turned on as soon as possible after arrival at the site to allow the mechanical components to warm up prior to checking flow rates. The heating system was turned on as soon as the pumps were in operation, to allow the air flow to stabilize. Windows were opened to allow escape of the heated air, so the heater would continue to operate.

A test filter cassette, identical to those used for sample collection, was placed on the pump system being calibrated and the airflow into the filter was measured using a calibrated rotameter. This followed AHERA requirements and good industrial hygiene (IH) sampling protocols. After the pumps were calibrated, a sampling cassette made of an electrically conducting plastic was attached to the sample line, placed directly over the heating register to be sampled, and securely held in place with duct tape. The cassette contained a 25 mm diameter mixed cellulose ester (MCE) membrane filter, having a nominal pore size of 0.45 μ m. The time at which sample collection was begun was recorded and the air was sampled for approximately three hours.

The pumps were operated for a length of time sufficient to draw about 1,600 liters (L) of air through each filter, based on the initial daily calibration. At the expiration of this time, the filter cassettes were removed from the heating register, inverted while the airflow continued, and lightly tapped to dislodge any fibers that may have adhered to the cowl of the cassette. Then, the cassettes were carefully removed from

the sampling pump, resealed with the plugs and end caps that are a part of the cassettes, and labeled. The flow rate of each pump was again determined by exactly the same procedure used prior to the start of sample collection. After all sampling was completed, the heating system was returned to the same condition and setting that was found on entry to the unit.

The volume of air drawn through each filter was calculated, based on the average sample flow rate and the duration of sample collection, and recorded on the cassette label. Each cassette was then sealed in an anti-static plastic zipper-seal bag and placed in a shipping carton with a custom-designed anti-static foam liner. All sampling equipment, samples and other gear were then removed from the unit and the site was secured prior to departure.

Air samples were collected from the four interior ducts as planned. In addition, a field blank was prepared and a background sample of ambient outside air was taken from a window located at the front of the house. No significant problems were encountered during the sample collection activities. Samples of dust were then collected from the four interior locations from which air samples were collected, since this unit had not been examined previously.

During the sampling effort, the facility was checked in an attempt to identify possible sources of asbestos that may be responsible for the fibers found in the dust. The heating system in this unit was fairly new, based on the appearance of the unit and associated ductwork. The return air register in the hall was connected to the heater by ductwork that did not include an expansion joint. The heater flue appeared to be a double-walled system of the type that often has fibrous insulation, sometimes containing asbestos, between the two walls. The floor ducts were 6"-diameter pipes that appear to be the concrete-asbestos type. A sheet metal lining was present at the opening but did not extend very far into the duct. A considerable amount of course sand was noted in all of the ducts examined.

3.3 LABORATORY PROCEDURES AND RESULTS

The four samples of air from within the unit were analyzed by WESTON's NVLAP-accredited TEM facility, using the sample preparation and analytical procedures set forth in the EPA AHERA method. A section of the exposed filter was cut from each sample and three wedges were placed on copper wire grids for TEM mounting. The samples were etched in a plasma asher, which also destroyed some of the organic materials that may have been collected, and vacuum-coated with a thin layer of carbon embedding the fibers that were on the filter surface. Each carbon-coated grid was placed in a Jaffe wick washer, in which the MCE filter matrix was dissolved and wicked away, leaving behind the carbon film containing any asbestos fibers collected. The grids were then examined and found to be ready for analysis.

Once the sample grids were prepared, each grid was examined by the TEM protocols of AHERA. A specified number of grid openings were scanned looking for fibers that may be asbestos. Typically, between six and ten grid openings had to be examined to comply with the detection limits set forth in the regulations. Whenever a fiber was observed during this examination, the microscopist examined its morphology and determined its elemental composition from the emitted X-ray spectrum. If these indicated that it may be an asbestiform mineral, the crystal lattice structure was examined by observation of its electron diffraction pattern. The fiber was then classified as non-asbestos or by the type of asbestos determined to be present during the analysis, as appropriate.

The results for the four samples from inside Unit 08 are presented in Table 3.1. No asbestos fibers were detected in any of these samples. The limit of detection for these samples ranged from 0.004 to 0.005 fibers per cubic centimeter (f/cc). Based on these findings, the background sample and field blank were not examined, since no fibers were detected inside the unit. The chrysotile form of asbestos was detected in three of the four dust samples, while no asbestos was found in the other one.

3.4 CONCLUSIONS AND RECOMMENDATIONS

The air samples collected indicate that fibers in the dust found within the heating system ductwork are not being released in significant quantities at this facility. The limits of detection were all at or below the acceptability limit set forth in AHERA, corresponding to 0.005 f/cc for clearance of an abatement area in a school, and were far lower than the OSHA Permissible Exposure Limit (PEL) for workers of 0.2 f/cc.

Asbestos was found in three of the four dust samples collected in this unit. This is in contrast with the finding of asbestos in six of the 12 samples of dust collected in other units at this location. The ductwork in the slab appears to possibly be concrete-asbestos pipe. A large quantity of sand was present in the floor ducts of this facility.

While asbestos has been shown to pose a health risk to humans at high fiber concentrations, there are no definitive studies that indicate that a risk is associated with low-level exposures such as the 0.005 f/cc AHERA limit. Sampling and analysis for airborne asbestos at this site did not reveal any health risk to the occupants of the houses, based on the TEM analyses of the samples collected. However, it is recommended by the U.S. Army Environmental Hygiene Agency (AEHA) that, if the units are to remain under the management, operational control, or ownership of the Army, additional sampling and analysis for airborne asbestos be undertaken. These studies should be performed to provide data from at least ten percent or a minimum of three of the housing units, whichever is greater. This additional sampling and analysis effort, along with the other recommended actions, will help to ensure that there is no long-term exposure risk to the occupants or to maintenance personnel.

TABLE 3.1. RESULTS OF AIRBORNE ASBESTOS SAMPLING AND ANALYSIS
(ALL VALUES IN FIBERS/CC)

SAMPLE NUMBER	SAMPLE LOCATION	ASBESTOS IN DUST	ASBESTOS CONCENTRATION	ASBESTOS TYPE FOUND
TA-432-LR	Living Room	NO	ND <0.005	ND
TA-432-DR	Dining Room	YES ¹	ND <0.005	ND
TA-432-BR	Bed Room	YES ¹	ND <0.005	ND
TA-432-BA	Bath Room	YES ¹	ND <0.004	ND

ND = Not Detected at the Limit of Detection Cited.

¹ Asbestos type was chrysotile.

SECTION 4. TRANSFORMER OILS

SECTION 4. TRANSFORMER OILS

WESTON personnel conducted a site visit at the Worth facility on 20 March 1990 to evaluate the potential use of polychlorinated biphenyls (PCBs) in mixtures used as insulating oils in the existing transformers serving the facility. Following inspection of several properties where the condition of the transformers was poor, a protocol was developed to address problems that were being encountered during this activity. Due to the age and deteriorated condition of many of the transformers, collection of samples, in some cases, posed an undue risk of causing environmental damage or exacerbating any that may already exist. If the transformers could not be sampled safely, in the judgement of the field team leader, or if the ownership of the units was in question, the planned sample collection was abandoned and any observations made by the field team were documented.

4.1 SAMPLING RATIONALE

Electrical transformers are often filled with a dielectric liquid which increases the resistance of the unit to arcing and also acts as a heat transfer medium to cool the coils. Many transformers are filled with a chlorinated fire-resistant fluid which meets the definition established in the National Electrical Code for "askarel", the generic name for non-flammable insulating liquids used in transformers. Prior to 1979, transformer askarel typically contained 60 to 100% PCBs. Askarel transformers were made in a variety of sizes containing from three to 3,000 gallons of PCB liquid.

Three types of transformers are defined in the regulations:

- PCB Transformer: Any transformer containing 500 ppm or greater PCBs.
- PCB-Contaminated Transformer: Any transformer containing 50-499 ppm PCBs.
- Non-PCB Transformer: Any transformer containing less than 50 ppm PCBs.

Sampling of transformers is conducted to verify which of these three categories of transformers are present. Depending upon the category determined, certain regulatory requirements including recordkeeping, marking, storage, and disposal must be satisfied.

In general, the sampling protocol followed by WESTON for this project was outlined in ANL's SAP. The plan identified sites where unlabeled, Army-owned transformers were thought to be present. The types, sizes, and precise locations of the transformers were not identified in the plan. Local utility company assistance was needed to identify ownership of the transformers and to provide services necessary to de-energize the high power lines prior to sampling. The objective of this task was to sample all Army-owned transformers serving the facility. However, it was agreed that sampling would not be attempted, if the sampling team determined that a spill which may result in environmental damage could occur, due to the intrusive effort involved. In such cases, name plate information and a general description of the transformer would be obtained. The following list presents potential conditions where sampling activities would not be attempted:

- Transformers are rusted and/or in very poor condition.
- Certain transformer hardware is in poor condition (i.e. drain valves, stopcocks, lid fastening bolts etc.)

- Transformers appear to be in good condition, but access is thwarted by bolts, wing nuts etc. that are "rusty shut".
- Transformer and/or transformer mounting pole ownership is questionable or is other than the U.S. Army.

4.2 SAMPLING METHODOLOGY AND OBSERVATIONS

On 20 March 1990, WESTON personnel arrived at the site to conduct transformer sampling activities. Five Army-owned transformers were identified, mounted on three utility poles. A utility pole located next to Unit 02 has one affixed transformer, another utility pole located next to Unit 05 has three mounted transformers, and one transformer is attached to a utility pole between Units 9 and 10. A Commonwealth Edison Electric utility crew was present to assist with the sampling by deenergizing the high-voltage power feed. Prior to sampling, WESTON personnel posted both the Health and Safety Plan and the route to the nearest medical center at the work area. In addition, the sampling team donned protective equipment including latex booties, saranex suit, latex and nitrile gloves, and a hard hat with face shield.

All transformers were accessed using a 40-foot bucket truck. The sampling procedure involved the removal of the transformer inspection plate, and collection of an oil sample. Upon removal of the transformer inspection plate, a tube was inserted into the transformer oil and internals. The liquid was agitated for approximately five minutes to obtain a homogeneous mixture of oil inside the transformer using great care to avoid spilling any fluid onto the ground. An attached siphon bulb was then manually operated to remove a sample of oil. Approximately 60 mL of sample from each transformer were placed in specially cleaned sample jars and then capped with teflon lined lids. All sample jars were labeled with identification and sampling information and placed into an ice-filled cooler at a temperature of approximately 4°C. Dedicated samplers were used on each transformer to prevent cross-contamination. Finally, transformer inspection plates were fastened after sampling.

Only two of the five transformers were sampled, because the single transformers behind Units 02 and 09, and the middle transformer behind Unit 05 were in relatively poor condition. Samples were collected from the two outside transformers behind Unit 05, which were newer and were made by a different manufacturer.

The following nameplate information was obtained from two of the three transformers that could not be safely sampled:

Manufacturer:	The Standard Transformer Company
Type:	A
KVA Rating:	From 37.5 to 50 KVA
Serial Number:	142064, 141733 (two devices)

The third transformer appeared to be of the same type, but it was in an inaccessible location behind Housing Unit 2. Nameplate information could not be obtained since it was not possible to get the bucket truck to the location of the pole.

The nameplate for the two outside transformers behind Unit 05 which were sampled read:

Manufacturer:	GE
Serial Number:	G9238594-65Y, G238586-65Y (two devices)
KVA Rating:	10 KVA

4.3 LABORATORY PROCEDURES AND RESULTS

The samples were transported to WESTON Analytics Laboratory in Lionville, Pennsylvania for laboratory analysis. Quality assurance and a strict chain-of-custody were maintained. The oils were analyzed according to procedures described in 40 CFR Part 761. This involved sample preparation to remove potential oxygen-containing compounds from interferences and sample dilution to achieve PCB concentrations within the analytical working range of the procedure. Gas chromatography with electron-capture detection of the PCB isomers was used to determine which PCB mixture, if any, is in the oil and quantify the amount of each PCB moisture present. Table 4.1 presents a description of the sample number, the sample location, and the results of laboratory analyses. A copy of the laboratory reports for these samples is provided in Appendix C.2.

The sample results show that both transformers are classified as non-PCB units. In addition, the recoveries of all QC spikes was within the acceptability limits of the procedure, ranging from 54% to 120% recovery.

4.4 CONCLUSIONS AND RECOMMENDATIONS

Five Army-owned transformers were identified at the Worth site. Two of these transformers were sampled and found to contain no detectable PCBs. Therefore they are assigned to the non-PCB category and no further action is required to comply with 40 CFR Part 761.65. The condition of the other three devices was such that the sampling could not be performed. They should be assumed to belong to the PCB-transformer category based on their ages, until a determination to the contrary is made. The transformers should then be identified in facility record, and by an appropriate label as possibly PCB-containing as long as their status is in question. Due to the age and condition of the transformer housing, the devices should be closely monitored to ensure that leaks which may cause environmental damage do not occur. When a decision is made to replace these devices with newer transformers that do not contain PCBs, they should be removed and moved to a staging area where they can be opened safely and sampled. A proper area should be capable of containing any oils that may be spilled during the opening and sampling of the transformers until the residues can be cleaned up satisfactorily. These transformers must be tested and disposed of properly after they are removed.

TABLE 4.1
RESULTS OF LABORATORY ANALYSES OF TRANSFORMER OILS
WORTH, ILLINOIS FHUs

(Concentrations in mg/kg)

SAMPLE NUMBER	SAMPLE LOCATION	PCB CONCENTRATION	AROCLOR IDENTIFICATION	TRANSFORMER CATEGORY
IL-53-PCB-01	Behind Unit 05 nearest house.	ND <6.0	NONE	NON-PCB
IL-53-PCB-02	Behind Unit 05, farthest from house	ND <6.0	NONE	NON-PCB

ND = Not Detected, Concentration is Lower than the Limit of Detection Cited.

SECTION 5. SUMMARY OF FINDINGS

SECTION 5. SUMMARY OF FINDINGS

Sampling and analyses performed at the Worth, Illinois FHU reveal the presence of issues of concern from an environmental standpoint. These include the presence of asbestos in all four samples of floor tile, the detection of asbestos in six of 12 dust samples, and the presence of transformers that may contain PCB's. No pipe insulation of any type was observed that was suspected of containing asbestos. Other suspect materials noted were roofing materials.

The risks posed by the asbestos-containing dust in the ductwork do not appear to be great since no airborne asbestos fibers were found during the follow-up study. Cleaning of the heating ducts would still be a prudent course of action, since the dust remains accessible to occupants of the facility.

The vinyl floor coverings and other suspect materials pose no significant risk as long as they are in good condition and are not damaged by excessive wear or misuse. They should be left in place and managed under an O&M program which describes procedures for the regular inspection of the floor coverings and the removal and replacement of any that become damaged, until they are eventually removed.

Samples for airborne asbestos were collected from four floor vents, one located in each of the living room, dining room, bedroom, and bathroom, in an unoccupied unit which had not been inspected previously. Consequently, samples of dust in the ductwork were also collected. The samples were subjected to analysis by transmission electron microscopy (TEM) to identify and quantify and asbestos fibers collected. There were no asbestos fibers found in any air sample from this facility, indicating that there is no health risk at this site due to the asbestos in the ductwork. However, additional sampling and analysis for airborne asbestos at this site is recommended by AEHA, if the units are to remain under the management, operational control, or ownership of the Army. These studies should be performed to provide data from at least ten percent or a minimum of three of the housing units, whichever is greater. Three of the four dust samples were found to contain the chrysotile form of asbestos.

Investigation of the electrical supply system at the property revealed that five transformers which are located on the property are owned by the U.S. Army. Three of the transformers are about 30 years old, range from fair to poor condition, and could not be accessed due to their location or the fact that two of the units were severely rusted. The two devices sampled were newer units which were found to be classed as non-PCB transformers. Since the remaining three are much older, they should be assumed to contain PCBs, based on their age and should be identified as probably PCB-containing in facility records and by appropriate labels. When these devices are replaced by newer, non-PCB devices, they should be moved to a secure location where they may be sampled safely to determine their final disposition. The transformers and oils must be disposed of in accordance with State and Federal regulations if they are found to contain PCBs.

APPENDIX A.1. FIELD DATA - ASBESTOS-CONTAINING MATERIALS

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01
 FACILITY/BLDG. NO. Worth Family Housing, Unit 3
 FACILITY CONTACT Gale Morton TELEPHONE NUMBER (708) 426-3315
 TECHNICIAN NAME Michael Kindley SIGNATURE Michael Kindley
 TECHNICIAN NAME Ruth Erga SIGNATURE Ruth Erga
 TIME ARRIVED 0130 TIME DEPARTED 10:55 1000 DATE 28 Feb 90
 dd mm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

Buildings chosen to survey at Worth were selected by Sam Cheek of Weston Inc. and Gale Morton, Housing Manager, to cover a representative range of the different types of houses. The houses chosen, as indicated by a records check, have had no major renovations in the last few years. There have been minor renovations and repairs to the houses, such as new furnaces, new roofs, painting, etc.

We have no record. Mrs. Smith, the occupant of the unit, was in the unit while we surveyed. Also Brad Bailey of Argonne National Labs accompanied us on this survey.

Unit 3 is a three bedroom Capehart-style house with a concrete slab base. Outside walls are covered by aluminum siding; the roof has tar shingles. The inside is covered by vinyl flooring, except for the Bath, which has ceramic tile. Walls and ceiling are painted plaster board. No insulation could be found on the pipe runs observed.

One floor tile and four dust samples were taken in Unit 3. The white 12" x 12" floor tile was laid down in May, 1987.

I could see down the pipe chase behind the Bath, and could observe

ACTIVITY CHECKLIST

Interviews Completed <u>No</u>	Number of Samples <u>5</u>
Drawings Reviewed <u>No</u>	Survey Form Completed <u>Yes</u>
Drawings Attached <u>Yes</u>	Site Log Completed <u>Yes</u>
Visual Inspection <u>Yes</u>	Chain-of-Custody Initiated <u>Yes</u>
Number of Photos <u>0</u>	Exp. Assess. Form Init. <u>Yes</u>
Q.A. Check <input checked="" type="checkbox"/>	SIGNATURE <u>Michael Skotnicki</u> DATE <u>21 MAR 90</u> dd mm yy

SITE SURVEY LOG

(Continued)

no insulation on pipe runs.

the team was here between 9:30A + 11:00A and nothing was disturbed or damaged.

Teresa [Signature]

2-28-98

The area for the closets are included with the area for the room in which the closet occurs.

The original units chosen to survey by Mr. Chock and Gale Morton were Units 5, 7, and 9. The units we actually surveyed were 3, 4, and 9.

Rubia Sistrunk said that these were the only three units that she could arrange for us to survey. She could not arrange an escort, but would call and arrange for the occupants to be at the units while we surveyed. Units 3, 4, and 9 are all three bedroom houses. There are some two bedroom units at Worth. I asked Brad Bailey from Argonne Labs about this. Mr. Bailey said that we should document the facts, but that we should proceed with the survey.

0759

W.O. No. 2104-13-01

CLIENT: ARGONNE NATIONAL LAB

R.1f Ery4

BLDG. NAME: Worth Family Housing Unit 3

DATE (dd/mm/yy): 28/01/90

BLDG. DESCRIPTION: Cupchart

TIME ARRIVED: 0 9 3 0

[illegible][illegible]

TECHNICIAN
SIGNATURE

Michael K. Long

QUALITY ASSURANCE
SIGNATURE

Michael Skornicki

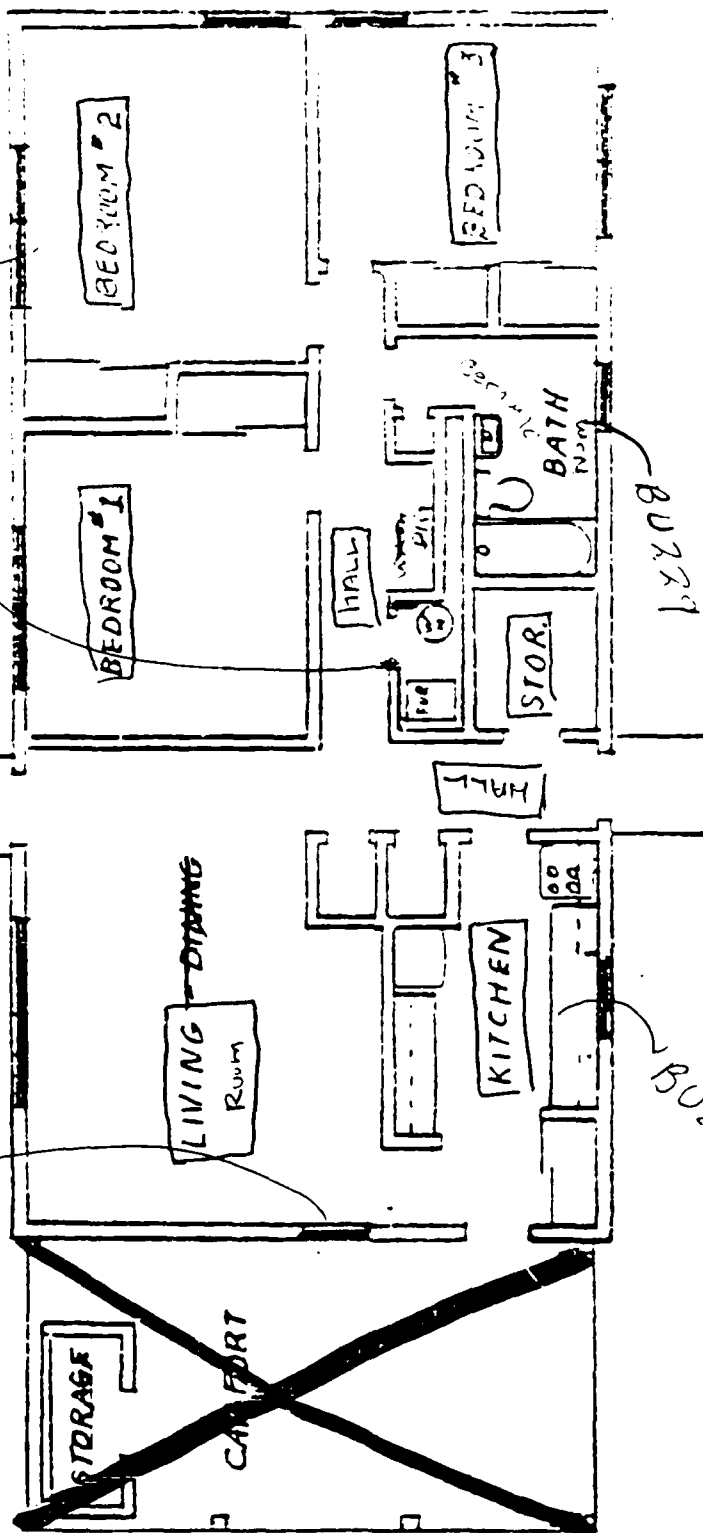
B0232

B0230

B0231

B0231

B0231



MCA 3 BEDROOM TYPE D HOME

ADDISON, ILL.

LE MONT, ILL.

WORTH, ILL.

1200 sq. ft.

Bldg 3
W. J. Smith

SCALE: 1/8" = 1'-0"
12-31-28

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01
 FACILITY/BLDG. NO. North Family Housing, Unit 4
 FACILITY CONTACT Gale Morton TELEPHONE NUMBER (708) 426-3315
 TECHNICIAN NAME Michael Kindley SIGNATURE Michael Kindley
 TECHNICIAN NAME Rolf Erga SIGNATURE Rolf Erga
 TIME ARRIVED 1002 TIME DEPARTED 1030 DATE 28 Feb/90
 dd mm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

When we arrived at Unit 4, Mrs. Ortiz was not prepared for us.

She said that no one had told her that we were coming.

Mrs. Ortiz said that she didn't mind us doing the survey. At 1005

Mr. Erga phoned Robin Sistrunk at the DEH. Mr. Sistrunk said that

someone was supposed to have called Mrs. Ortiz, and it was alright

to proceed with the survey if Mrs. Ortiz said it was alright.

Unit 4 is a three bedroom Capehart-style unit with a concrete slab base.

Outside walls are aluminum siding; roof is covered by tar shingles.

Inside floors are covered by vinyl flooring, except the Bath, which

has ceramic tile on the floor. Walls and ceilings are painted plaster

board. No insulation was found in pipe runs, including those in pipes

chase behind Bath.

One floor tile and four dust samples were taken in this unit.

The closet in Bedroom 1 has been turned into a utility/storage room (Stor 2).

The area for each closet is included with the area for the room in which the closet occurs.

~~The closet in Bedroom 1 has been turned into a utility/storage area (Stor 2)~~

ACTIVITY CHECKLIST

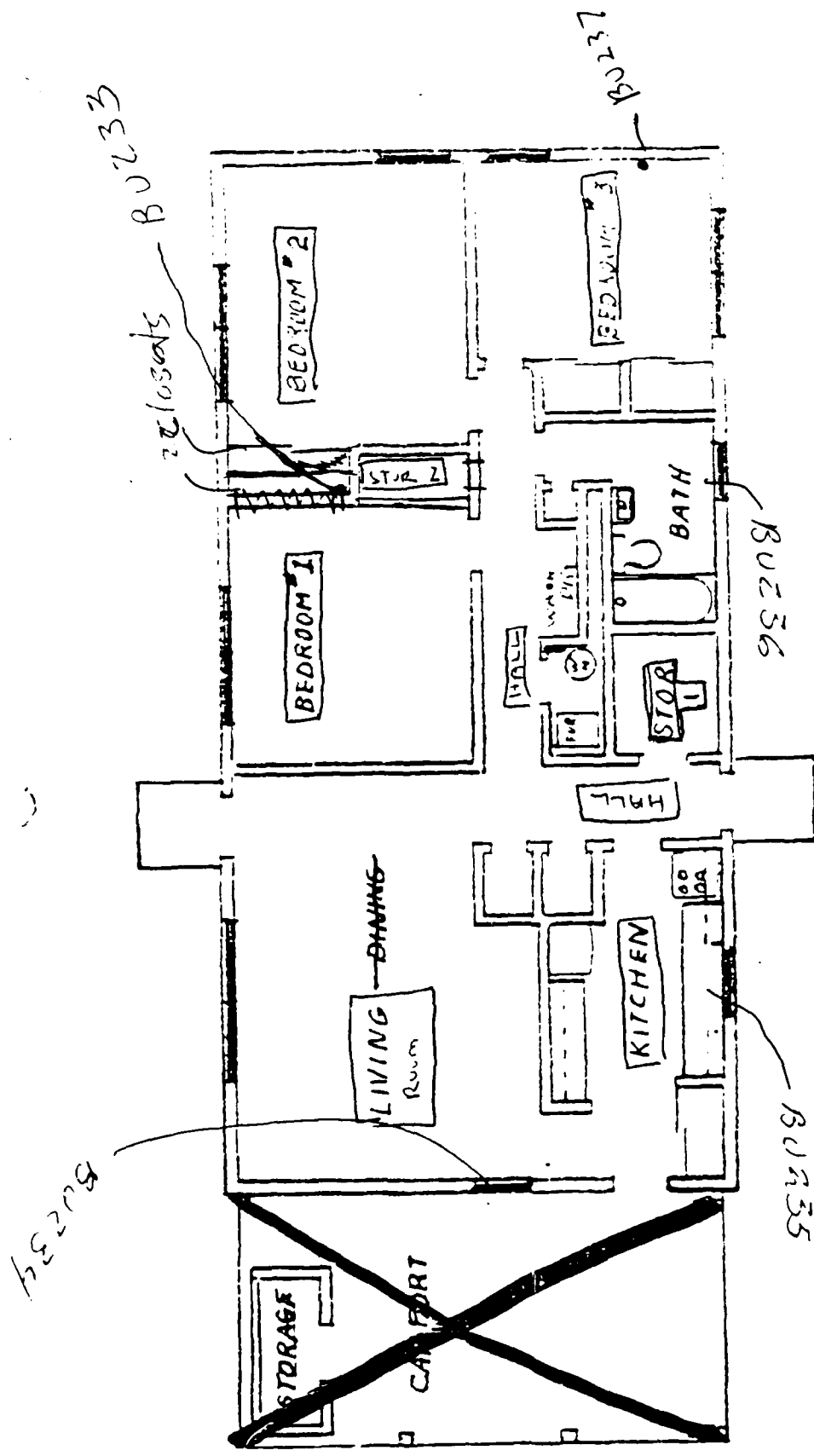
Interviews Completed <u>No</u>	Number of Samples <u>5</u>
Drawings Reviewed <u>No</u>	Survey Form Completed <u>Yes</u>
Drawings Attached <u>Yes</u>	Site Log Completed <u>Yes</u>
Visual Inspection <u>Yes</u>	Chain-of-Custody Initiated <u>Yes</u>
Number of Photos <u>0</u>	Exp. Assess. Form Init. <u>Yes</u>
Q.A. Check <input checked="" type="checkbox"/>	SIGNATURE <u>Michael Skotnicki</u> DATE <u>21 MAR/90</u> dd mm yy

SITE SURVEY LOG

(Continued)

The asbestos team was in Unit 4 between 1002 and 1030. Nothing was
disturbed or damaged.

Danman Ortiz Feb 28, 1992



MCA 3 BEDROOM TYPE D HOME

ADDISON, ILL. LEMONT, ILL. WORTH, ILL.
1200 sq. ft.

WORTH
UNIT 4

SCALE: 1/8" = 1'-0"
12-31-64

MIRROR IMAGE

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. Worth Family Housing Unit 9

FACILITY CONTACT Gale Morton TELEPHONE NUMBER (708) 926-3315

TECHNICIAN NAME Michael Kindley SIGNATURE Michael Kindley

TECHNICIAN NAME Ruit Erya SIGNATURE Ruit Erya

TIME ARRIVED 1032 TIME DEPARTED 1105 DATE 28 Feb/90
dd mm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

Unit 9 is a three bedroom Capehart-style unit with a concrete slab base.

Outside walls are aluminum siding; roof is covered by tar shingles. Inside floors are covered by vinyl flooring, while the walls and ceilings are painted plaster board. All pipes runs observed, including in pipe chase behind Bath are bare w/ insulation. The areas for the closets are included with the area for the room in which the closet occurs.

Two floor tile samples and floor dust samples were taken in Unit 9.

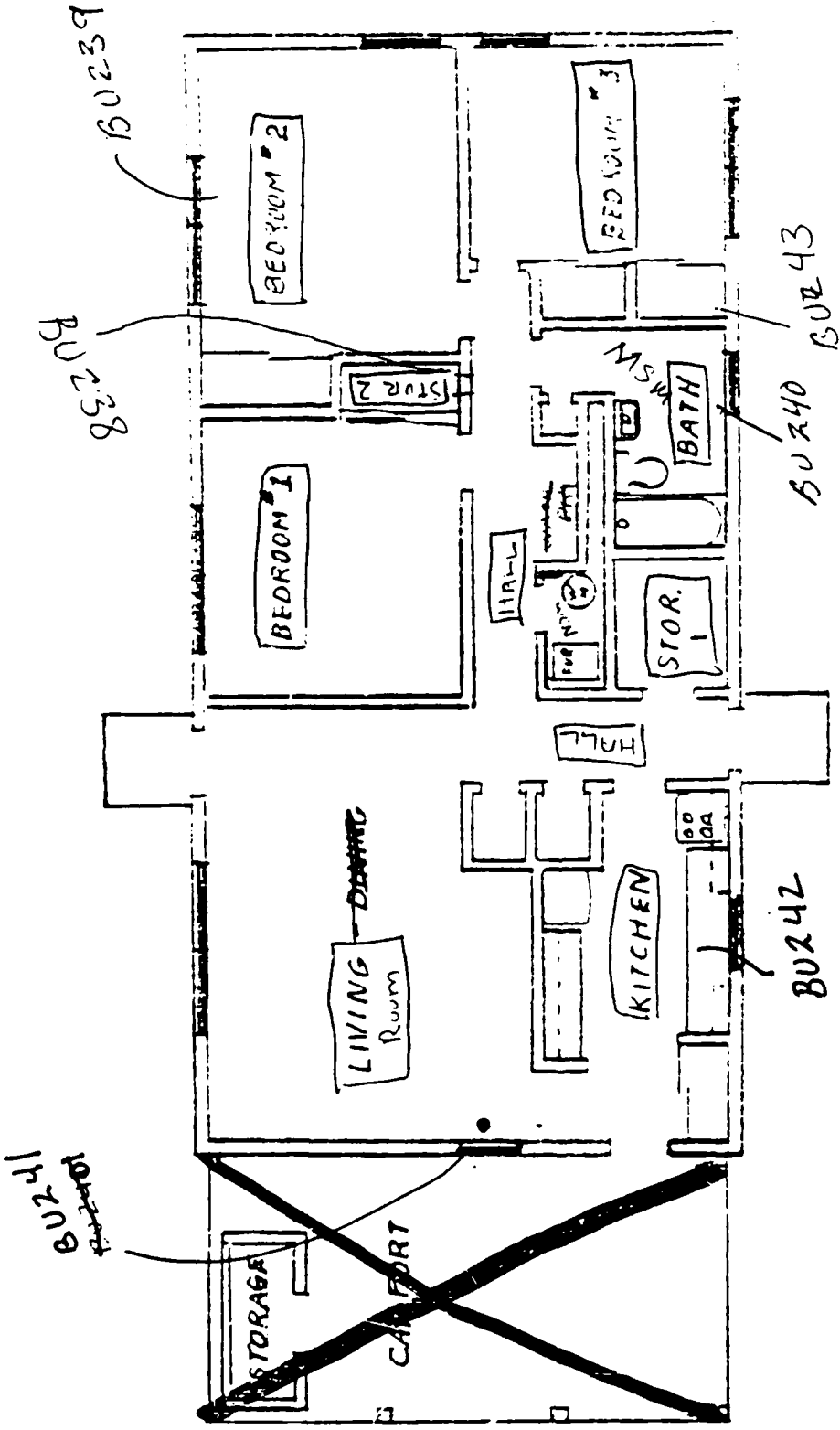
The closet in Bedroom 1 has been turned into a storage room. The black 9 x 9 floor tile in this room is probably the original tile.

The asbestos team was in Unit 9 between 1032 and 1105. Nothing was disturbed or damaged during this time.

Brigitte Bassett 28-Feb-1990

ACTIVITY CHECKLIST

Interviews Completed <u>No</u>	Number of Samples <u>6</u>
Drawings Reviewed <u>No</u>	Survey Form Completed <u>Yes</u>
Drawings Attached <u>Yes</u>	Site Log Completed <u>Yes</u>
Visual Inspection <u>Yes</u>	Chain-of-Custody Initiated <u>Yes</u>
Number of Photos <u>0</u>	Exp. Assess. Form Init. <u>Yes</u>
Q.A. Check <input checked="" type="checkbox"/>	SIGNATURE <u>Michael Skofnicki</u> DATE <u>21 MAR/90</u> dd mm yy



MCA 3 BEDROOM TYPE D HOME

APPISON, ILL. LEMONT, ILL. WORTH, ILL.
1200 sq. ft.

SCALE: 1/8" = 1'-0"
12-31-68 JEV

WORTH
Unit 9
mirror image

APPENDIX A.2. LABORATORY DATA - ASBESTOS-CONTAINING MATERIALS

BULK SAMPLE ANALYSIS SUMMARY

Weston W.O. No. 2104-13-01-0000

Sample Number BU228 through Sample BU243

AO LAB ID NO	CLIENT/CLIENT ID	LOCATION	MATERIAL DESCRIPTION *	DATE RECEIVED	RESULTS **					LAYERS	ANALYST
					CH	AM	CR	OT	TL		
BU228	53-1L-003-AFT	HALL	NF, WH, 12X12 FT	03/05/90	ND	ND	ND	ND	ND	Yes	07323
BU233	53-1L-004-AFT	BEDRM1	NF, WH, 12X12 FT	03/05/90	<1	ND	ND	ND	<1	Yes	07323
BU238	53-1L-009-AFT	STOR 2	NF, BK, 9X9 FT	03/05/90	15	ND	ND	ND	15	Yes	07323
BU243	53-1L-009-AFT	BEDRM3	NF, BR, 12X12 FT	03/05/90	<1	ND	ND	ND	<1	Yes	07323

* MATERIAL DESCRIPTION	FRIABLE ¹	COLOR ²		SYSTEM ³
Friable ¹ , Color ² , System ³ , Type	F - Friable NF - Non-Friable	BK - Black BL - Blue BR - Brown GR - Green GY - Gray	RD - Red TN - Tan WH - White YL - Yellow	CHW - Chilled Water DOM - Domestic Water HHW - Heating Hot Water STM - Steam UNK - Unknown
** RESULTS				
CH - Chrysotile AM - Amosite CR - Crocidolite	OT - Other TL - Total			

Upon issue, this report may be reproduced only in full.

All analyses are performed in accordance with the methods set forth in U.S. EPA 600/M4-82-020, as amended. Weston's Optical Microscopy Laboratory is accredited by the National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program for asbestos fiber analysis (Laboratory Code 1254).



ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

Transmission Electron Microscopy
Asbestos Summary Report

Client: Argonne National Laboratories Weston W.O. No.: 2104-13-01-0000

Sample Type(s): Dust and Floor Tiles Sampling Location: Worth

QUALITATIVE ANALYSIS

FLOOR TILES: A 0.5 to 2.0 gram portion of each floor tile sample was ultrasonically disaggregated in four milliliters of deionized, 0.2 μ m membrane filtered water. After the coarse fraction settled, a drop of the suspended, clay-sized fraction was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated for thermal stability in the electron beam and examined with a Philips CM12 transmission electron microscope operating at 120 kilovolts accelerating voltage.

DUST WIPE SAMPLES: A generous loading of dust was collected on a pre-wetted, 25 square centimeter section of a cleanroom wipe. The wipe was placed in a two ounce wide mouth collection vial and returned to the laboratory. Ten to fifteen milliliters of filtered, deionized water was added to suspend the dust. The suspension was ultrasonically dispersed and the coarse fraction was allowed to settle. A drop of the suspension was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated as above and examined by transmission electron microscopy at 120 kilovolts accelerating voltage.

ANALYTICAL RESULTS

SAMPLE IDENTIFICATION

RESULTS

BU228-53-IL-003-AFT	Positive
BU229-53-IL-003-ATD	Positive
BU230-53-IL-003-ATD	Positive
BU231-53-IL-003-ATD	Negative
BU232-53-IL-003-ATD	Positive
BU234-53-IL-004-ATD	Positive
BU235-53-IL-004-ATD	Negative
BU236-53-IL-004-ATD	Positive
BU237-53-IL-004-ATD	Negative
BU239-53-IL-009-ATD	Positive
BU240-53-IL-009-ATD	Negative



ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

ANALYTICAL RESULTS
(continued)

SAMPLE IDENTIFICATION

BU241-53-IL-009-ATD
BU242-53-IL-009-ATD

RESULTS

Negative
Negative

Barry Rayfield
(Approved for Transmittal)

4/10/90
(Date)

- * This test report relates only to the specific items tested.
- ** These sample results may only be reproduced in full, and are valid only if approved for transmittal.

APPENDIX B.1. FIELD DATA - AIRBORNE ASBESTOS

FIELD NOTES FOR**WORTH, ILLINOIS SITE**

The Worth site is another Capehart, slab-on-grade unit with vinyl exterior siding and an asphalt shingle roof. The facility is a three-bedroom, one-bath unit and has been renovated at some point. The primary asbestos issues were the floor tiles and the heater ducts. The floor tiles are a 12"x12" gray mottled pattern in the entire tiled area, that includes all rooms of the facility with the exception of the bathroom. There are several areas, particularly in the bedroom at the rear of the house, where this floor tile has been patched by replacing sections. The facility is heated by a furnace which is apparently relevantly new. There is no expansion duct in the current system but the sheet metal is brand new. It appears that the flue may perhaps be of the doublewall lined variety and may, based on its age, contain asbestos since metalbestos flues were common during the time in which it was installed. Sampling was performed at vents in the kitchen, livingroom, bedroom, at the rear of the building on the end and the bathroom. An outside sample was also collected. Dust samples were collected from the same vents on the inside. Unlike other units, the ducts in these units appear to be runs which end in a small boot into which the floor grill has been inserted. In all ducts examined, a substantial amount of dirt and/or sand was encountered. The reasons for this are not clear. The approximate 6" diameter pipes leading into the floor vents appear to be of a transite material. The kitchen vent is located underneath the kitchen counter and has been extended by means of a sheet metal duct which fits underneath the counter bottom to a grill located along the front kickboard otherwise there was nothing unusual about any of the ductwork samples. Sampling was begun at 11:20 a.m. after arriving on site to meet the DEH person at 10:30. The start of sampling was delayed slightly by the occupant who was still here upon arrival. Sampling was completed, dust

samples were taken, and equipment was packed so that the site was departed at 4:00 p.m. The weather during the day was extremely hot, approximately 87 degrees and very humid. The inside surfaces of the unit appeared to be somewhat sticky due to the humidity.

AIR MONITORING DATA

CLIENT Argonne Nat'l Lab. WORKER ORDER NUMBER 2104-13-02
 PROJECT LOCATION North ZL Unit 08
 WORK AREA ID NO. _____ SAMPLE NO. W0-08-LR

SAMPLE TYPE

☐ PERSONNEL ☒ AMBIENT
☐ WORK AREA ☐ CLEAN ROOM ☐ CLEARANCE
☐ ADJACENT ROOM ☐ AFD EXHAUST ☐ INITIAL
☐ BACKGROUND ☐ OTHER ☐ FINAL REOCCUPANCY
☒ OTHER Living Room Vent ☐ TWA SAMPLE
 TASK _____ (SEE ADDITIONAL SHEETS)

SAMPLE DATA

Filter area (FA), mm: 855 ☒ 385
 PUMP ID 70 1126 1359 153 min
 PUMP Cal Initial 19 10.4 10.4 L/min
 PUMP Cal Final 20 10.4 1590 L/min
 Technician L. Nelms Date 25 Apr '90

ANALYTICAL DATA

ANALYST _____
 Scope ID _____ Microscopic Field Area (MFA), mm² _____
 Date Time Mounted _____ Date Time Counted _____
 Total Fibers Counted _____ Total Fields Counted _____
 Average Count _____ f/field Blank Count _____ f/field
 Blank Corrected Count (BCC) _____ Fiber Density _____ f/mm²
 Detection Limit (DL) _____ Concentration (C) _____ f/cc

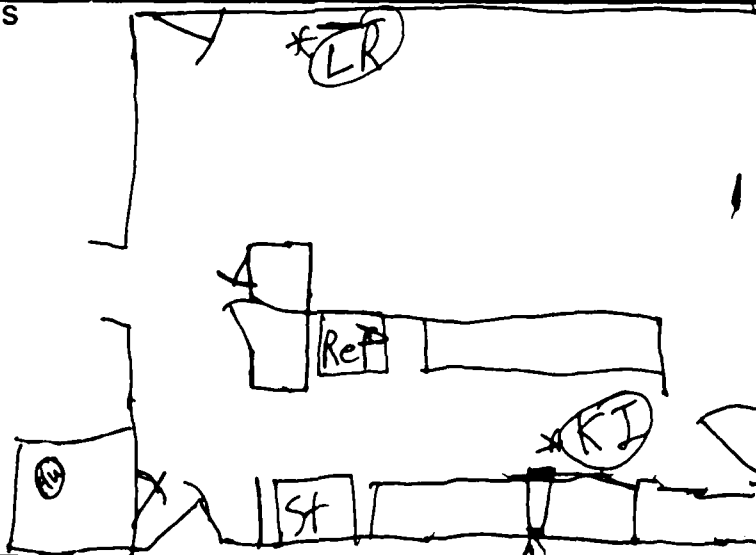
C (BCC)(FA)
 (VA)(MFA)(1000) DL = 10 fibers 100 fields

The above-reported results were obtained when the sample was counted in accordance with NIOSH 7400.

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
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7										
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9										
10										

NOTES/SKETCHES/REMARKS

TEM



AIR MONITORING DATA

CLIENT Argonne Nat'l Lab. ATC PROJECT NUMBER 2104-13-02
 PROJECT LOCATION Worth, IL Unit 08
 WORK AREA ID NO. _____ SAMPLE NO. W0-08-K.I

SAMPLE TYPE

☐ PERSONNEL

NAME _____

TASK _____

☒ AMBIENT

☐ WORK AREA

☐ ADJACENT ROOM

☐ BACKGROUND

☒ OTHER

☐ CLEAN ROOM

☐ AFD EXHAUST

☐ CLEARANCE

☐ INITIAL

☐ FINAL, REOCCUPANCY

☐ OTHER

☐ TWA SAMPLE

(SEE ADDITIONAL SHEETS)

Kitchen Vent

SAMPLE DATA

Filter area (FA) mm 855 X385

PUMP ID 80

PUMP Cal. Initial

PUMP Cal. Final

1125
Time Began

1400
Time End

155
Sample Time min

L. Nelms
Technician

25 Apr '90
Date

17 10.3 10.3

18 10.3 1600

ANALYTICAL DATA

ANALYST _____

Microscopic Field Area (MFA) mm²

Date Time Counted

Total Fields Counted

Field Count

Field Density

Concentration (cf)

C (BC) MFA

DL 10 fibers 100 fields

The above values were obtained when the sample was counted on a NIOSH 7400

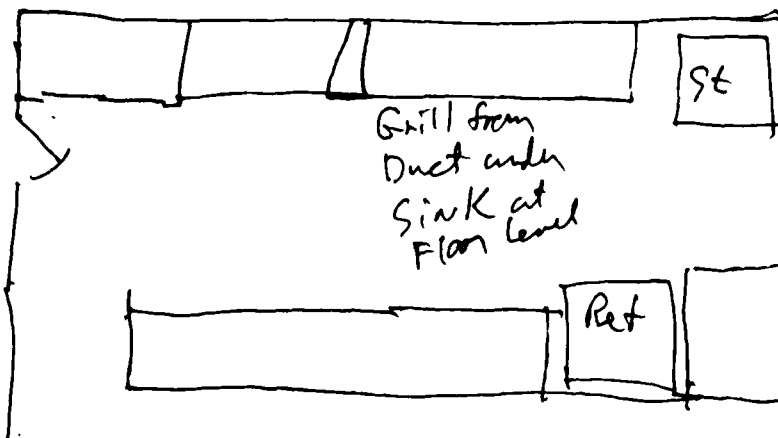
Date

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
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7										
8										
9										
10										

NOTES SKETCHES REMARKS

TEM

an extension duct
to a vertical grill
has been Added
under sink.



AIR MONITORING DATA

CLIENT Argonne Nat'l Lab. ATC PROJECT NUMBER 2104-13-02
 PROJECT LOCATION Worth Unit 08
 WORK AREA ID NO. _____ SAMPLE NO. WO-08-BR

SAMPLE TYPE

☐ PERSONNEL

NAME _____

TASK _____

☒ AMBIENT

☐ WORK AREA

☐ ADJACENT ROOM

☐ BACKGROUND

☒ OTHER

☐ CLEAN ROOM

☐ AFD EXHAUST

Bedroom Vent

☐ CLEARANCE

☐ INITIAL

☐ FINAL REOCCUPANCY

☐ OTHER

☐ TWA SAMPLE

(SEE ADDITIONAL SHEETS)

SAMPLE DATA

Filter area (FA) mm

855

☒ 385

PUMP ID

99

PUMP Cal Initial

19

10.0

9.8

PUMP Cal Final

20

9.6

1550

1123

Time Begin

1401

Time End

158

Sample Time min

L. Nelms

Technician

25 Apr '90

Date

ANALYTICAL DATA

ANALYST _____

Signature

Microscopic Field Area (MFA) mm²

Date Time Counted

Date Time Counted

Total Fields Counted

Total Fields Counted

Concentration (C) fibers/cc

Concentration (C) fibers/cc

C (RDC)(FA)
(VA)(MFA)(1000)

DL 10 fibers 100 fields

The above reported results were obtained when the sample was counted in accordance with NIOSH 7400

Signature

Date

	1	2	3	4	5	6	7	8	9	10
1										
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6										
7										
8										
9										
10										

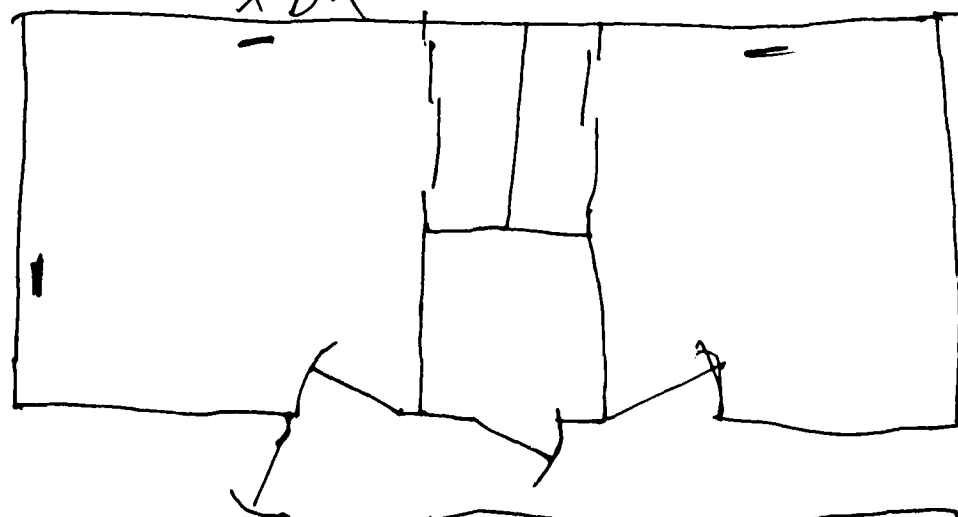
NOTES SKETCHES REMARKS

TEM

* BR

Back

End



Front Door

AIR MONITORING DATA

CLIENT Argonne Nat'l Lab ATC PROJECT NUMBER 2104-13-02
 PROJECT LOCATION Worth, IL Unit 08
 WORK AREA ID NO. _____ SAMPLE NO. wo-08-BA

SAMPLE TYPE

PERSONNEL

NAME _____

TASK _____

☒ AMBIENT

☐ WORK AREA

☐ ADJACENT ROOM

☐ BACKGROUND

☒ OTHER Bathroom Vent

☐ CLEAN ROOM

☐ AFD EXHAUST

☐ CLEARANCE

☐ INITIAL

☐ FINAL REOCCUPANCY

☐ OTHER

☐ TWA SAMPLE
(SEE ADDITIONAL SHEETS)

SAMPLE DATA

Filter area (FA) mm 855 ☒ 385

PUMP ID

97

PUMP ID

19 10.2 10.3

PUMP ID

20 10.4 1630

1124

Time Begin

1402

Time End

158

Sample Time min

L. Nelms

Technician

25 Apr '90

Date

ANALYTICAL DATA

ANALYST

Method: TSP/PM10/PM2.5

Method: TSP/PM10/PM2.5

Method: TSP/PM10/PM2.5

Method: TSP/PM10/PM2.5

Method: TSP/PM10/PM2.5

Method: TSP/PM10/PM2.5

Method: TSP/PM10/PM2.5

Method: TSP/PM10/PM2.5

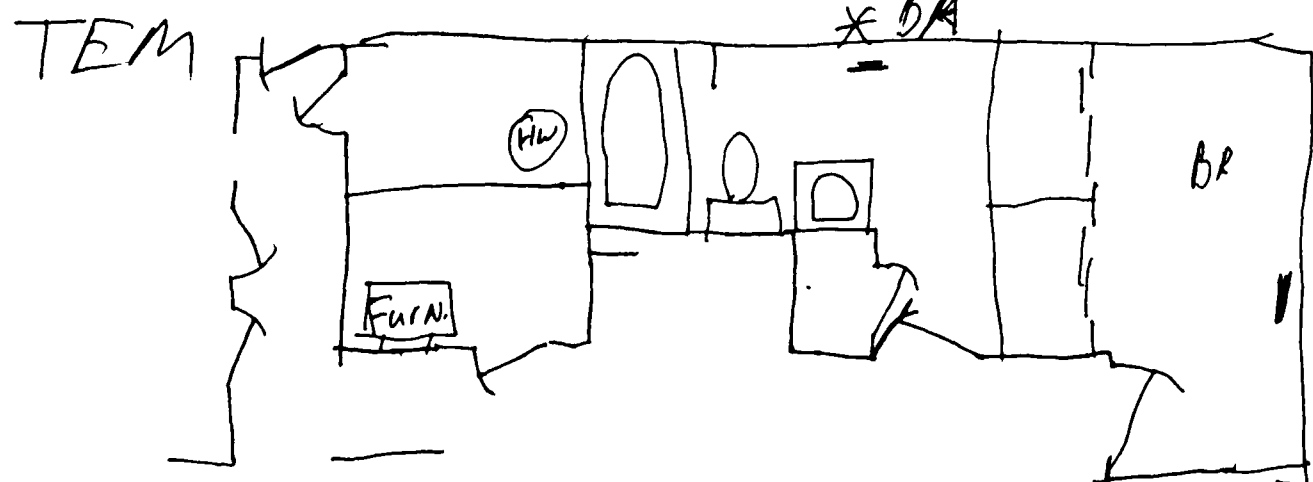
Method: TSP/PM10/PM2.5

Method: TSP/PM10/PM2.5

Method: TSP/PM10/PM2.5

	1	2	3	4	5	6	7	8	9	10
1										
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3										
4										
5										
6										
7										
8										
9										
10										

NOTES SHEETS REMARKS



AIR MONITORING DATA

CLIENT Argonne Nat'l Lab. WORKER ORDER NUMBER 2104-13-02
 PROJECT LOCATION Worth, IL Unit 08
 WORK AREA ID NO. _____ SAMPLE NO. WO-08-047

SAMPLE TYPE

☐ PERSONNEL

☒ AMBIENT

☐ WORK AREA

☐ ADJACENT ROOM

☒ BACKGROUND

☐ OTHER _____

☐ CLEAN ROOM

☐ AFD EXHAUST

☐ CLEARANCE

☐ INITIAL

☐ FINAL REOCCUPANCY

☐ OTHER _____

TWA SAMPLE

(SEE ADDITIONAL SHEETS)

NAME _____

TASK _____

SAMPLE DATA

Filter area (FA), mm _____

855

☒ 385

PUMP ID _____

82

PUMP Cal Initial

13

9.2

9.2

L/min

PUMP Cal Final

14

9.1

1560

Sample Vol, L

1122

1412

170

L. Nelms

25 Apr '90

ANALYTICAL DATA

ANALYST _____

Scope ID _____

Microscopic Field Area (MFA) _____

Date/Time Mounted _____

Date/Time Counted _____

Total Fibers Counted _____

Total Fields Counted _____

Average Count _____

f/fig

Blank Check _____

f/fig

Blank Corrected Count (BCC) _____

Fiber Density _____

f/cm²

Detection Limit (DL) _____

f/cc

Concentration (C) _____

f/cc

C (BCC)(FA)

(VA)(MFA)(1000)

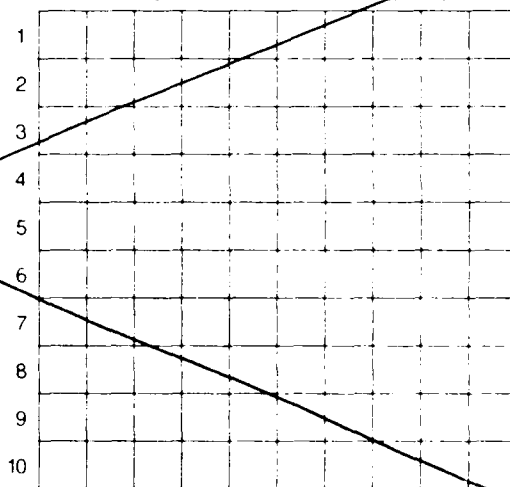
DL 10 fibers 100 fields

The above-reported results were obtained when the sample was counted in accordance with NIOSH 7400

Signature _____

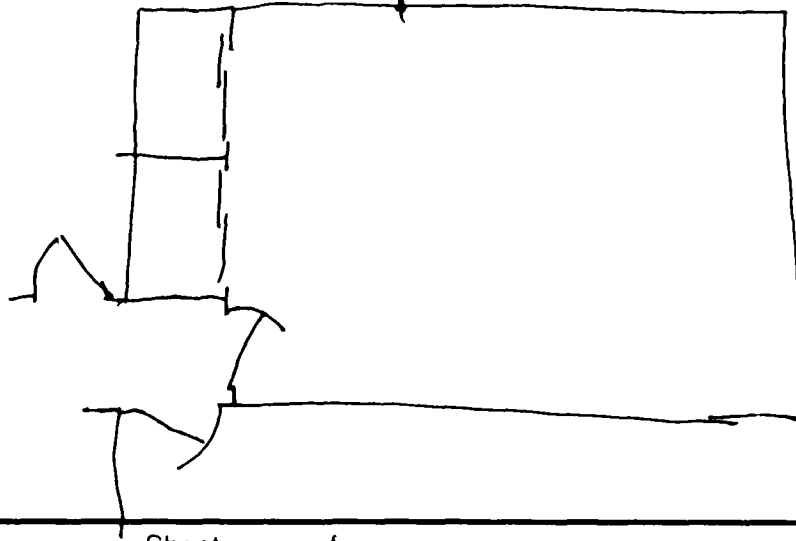
Date _____

1 2 3 4 5 6 7 8 9 10



NOTES SKETCHES REMARKS

TEM



AIR MONITORING DATA

CLIENT Argonne Nat'l Lab. WORKER ORDER NUMBER 2104-13-02
 PROJECT LOCATION Worth IL Unit 08
 WORK AREA ID NO. _____ SAMPLE NO. WO-08-FB

SAMPLE TYPE

☐ PERSONNEL ☒ AMBIENT
☐ WORK AREA ☐ CLEAN ROOM
☐ ADJACENT ROOM ☐ AFD EXHAUST
☐ BACKGROUND ☒ OTHER Field Blank
 NAME _____ TASK _____
☐ CLEARANCE
☐ INITIAL
☐ FINAL REOCCUPANCY
☐ OTHER _____
☐ TWA SAMPLE (SEE ADDITIONAL SHEETS)

SAMPLE DATA

Filter area (FA), mm: ☐ 855 ☒ 385
 PUMP ID None
 PUMP Cal Initial N/A rate 0 L/min
 PUMP Cal Final N/A rate 0 L/min
 Sample Volume (VA) _____
 Time Begin 1121 Time End 1413 Sample Time 172 min
 Technician L. Nelson Date 25 Apr '90

ANALYTICAL DATA

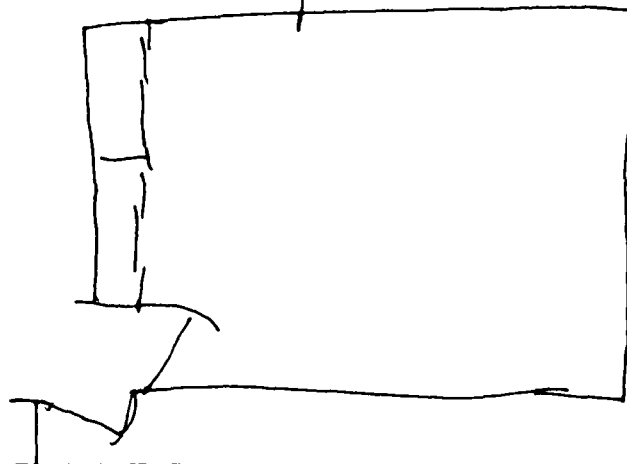
ANALYST _____
 Scope ID _____ Microscopic Field Area (MFA) _____ mm²
 Date/Time Mounted _____ Date/Time Counted _____
 Total Fibers Counted _____ Total Fields Counted _____
 Average Count _____ f/fig _____ f/fig
 Blank Corrected Count (BCC) _____ Fiber Density _____ f/mm²
 Detection Limit (DL) _____ f/cc _____ f/cc
 Concentration (C) _____ f/cc
 (BCC)(FA)
 C = _____
 (VA)(MFA)(1000)
 DL = 10 fibers 100 fields
 The above-reported results were obtained when the sample was counted in accordance with NIOSH 7400
 Signature _____ Date _____

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

NOTES SKETCHES REMARKS

Front-outside End BR Frontside window,
*OUT

TFM



APPENDIX B.2. LABORATORY DATA - AIRBORNE ASBESTOS



ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY
ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: WO-08-LR

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: EE993

Received by: Beth Hiltbold
Analyzed by: Greg Hall

Date Received: 04/30/90
Date Analyzed: 05/01/90

Filter Type: 0.45 μ m, 25 mm, MEC
Number of Grids Examined: 2
Average Grid Square Area: 0.0088 mm²
Sample Volume: 1590.0 liters
EPA Analysis: AHERA

Filter Area: 385 mm²
Number of Grid Squares Examined: 6
Total Area Examined: 0.0528 mm²
Detection Limit: 0.00459 fibers/cc
Grid Archive No.: 0228-D-1,2

ANALYTICAL RESULTS

	<u>Chrysotile</u>		<u>Amphiboles</u>		Ambiguous	Non-Asbestos
	<5 μ m	\geq 5 μ m	<5 μ m	\geq 5 μ m		
Number of Fibers Analyzed:	0	0	0	0	0	0
Number of Bundles Analyzed:	0	0	0	0	0	0
Number of Clusters Analyzed:	0	0	0	0	0	0
Number of Matrices Analyzed:	0	0	0	0	0	0

SUMMARY

Concentration of Asbestos Structures < 5 μ m in length: ND (structures/cc)
Concentration of Asbestos Structures \geq 5 μ m in length: ND (structures/cc)
Concentration of Asbestos Structures < 5 μ m in length: ND (structures/mm²)
Concentration of Asbestos Structures \geq 5 μ m in length: ND (structures/mm²)
Total Concentration of Asbestos Structures ND (structures/cc)
Total Concentration of Asbestos Structures ND (structures/mm²)

Comments:


(Approved for Transmittal)

May 2, 1990
(Date)

This test report relates only to the specific items tested.



ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY
ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: WO-08-KI

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: EE994

Received by: Beth Hiltbold
Analyzed by: Greg Hall

Date Received: 04/30/90
Date Analyzed: 05/01/90

Filter Type: 0.45 μ m, 25 mm, MEC
Number of Grids Examined: 2
Average Grid Square Area: 0.0088 mm²
Sample Volume: 1600.0 liters
EPA Analysis: AHERA

Filter Area: 385 mm²
Number of Grid Squares Examined: 6
Total Area Examined: 0.0528 mm²
Detection Limit: 0.00456 fibers/cc
Grid Archive No.: 0228-D-4,5

ANALYTICAL RESULTS

	<u>Chrysotile</u>		<u>Amphiboles</u>		<u>Ambiguous</u>	<u>Non-Asbestos</u>
	<u><5μm</u>	<u>\geq5μm</u>	<u><5μm</u>	<u>\geq5μm</u>		
Number of Fibers Analyzed:	0	0	0	0	0	0
Number of Bundles Analyzed:	0	0	0	0	0	0
Number of Clusters Analyzed:	0	0	0	0	0	2
Number of Matrices Analyzed:	0	0	0	0	0	0

SUMMARY

Concentration of Asbestos Structures < 5 μ m in length: ND (structures/cc)

Concentration of Asbestos Structures \geq 5 μ m in length: ND (structures/cc)

Concentration of Asbestos Structures < 5 μ m in length: ND (structures/mm²)

Concentration of Asbestos Structures \geq 5 μ m in length: ND (structures/mm²)

Total Concentration of Asbestos Structures ND (structures/cc)

Total Concentration of Asbestos Structures ND (structures/mm²)

Comments:


(Approved for Transmittal)

May 2, 1990
(Date)

This test report relates only to the specific items tested.



ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY
ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: WO-08-BR

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: EE995

Received by: Beth Hiltbold
Analyzed by: Greg Hall

Date Received: 04/30/90
Date Analyzed: 05/01/90

Filter Type: 0.45 μ m, 25 mm, MEC
Number of Grids Examined: 2
Average Grid Square Area: 0.0088 mm²
Sample Volume: 1550.0 liters
EPA Analysis: AHERA

Filter Area: 385 mm²
Number of Grid Squares Examined: 6
Total Area Examined: 0.0528 mm²
Detection Limit: 0.00470 fibers/cc
Grid Archive No.: 0228-E-2,3

ANALYTICAL RESULTS

	<u>Chrysotile</u>		<u>Amphiboles</u>		<u>Ambiguous</u>	<u>Non-Asbestos</u>
	<u><5μm</u>	<u>\geq5μm</u>	<u><5μm</u>	<u>\geq5μm</u>		
Number of Fibers Analyzed:	0	0	0	0	0	0
Number of Bundles Analyzed:	0	0	0	0	0	0
Number of Clusters Analyzed:	0	0	0	0	0	0
Number of Matrices Analyzed:	0	0	0	0	0	0

SUMMARY

Concentration of Asbestos Structures < 5 μ m in length: ND (structures/cc)

Concentration of Asbestos Structures \geq 5 μ m in length: ND (structures/cc)

Concentration of Asbestos Structures < 5 μ m in length: ND (structures/mm²)

Concentration of Asbestos Structures \geq 5 μ m in length: ND (structures/mm²)

Total Concentration of Asbestos Structures ND (structures/cc)

Total Concentration of Asbestos Structures ND (structures/mm²)

Comments:


(Approved for Transmittal)

May 2, 1990
(Date)

This test report relates only to the specific items tested.



ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY
ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: WO-08-BA

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: EE996

Received by: Beth Hiltbold
Analyzed by: Greg Hall

Date Received: 04/30/90
Date Analyzed: 05/01/90

Filter Type: 0.45 μ m, 25 mm, MEC
Number of Grids Examined: 2
Average Grid Square Area: 0.0088 mm²
Sample Volume: 1630.0 liters
EPA Analysis: AHERA

Filter Area: 385 mm²
Number of Grid Squares Examined: 6
Total Area Examined: 0.0528 mm²
Detection Limit: 0.00447 fibers/cc
Grid Archive No.: 0228-E-5,A-6

ANALYTICAL RESULTS

	<u>Chrysotile</u>		<u>Amphiboles</u>		<u>Ambiguous</u>	<u>Non-Asbestos</u>
	<u><5μm</u>	<u>\geq5μm</u>	<u><5μm</u>	<u>\geq5μm</u>		
Number of Fibers Analyzed:	0	0	0	0	0	1
Number of Bundles Analyzed:	0	0	0	0	0	0
Number of Clusters Analyzed:	0	0	0	0	0	0
Number of Matrices Analyzed:	0	0	0	0	0	0

SUMMARY

Concentration of Asbestos Structures < 5 μ m in length: ND (structures/cc)
Concentration of Asbestos Structures \geq 5 μ m in length: ND (structures/cc)
Concentration of Asbestos Structures < 5 μ m in length: ND (structures/mm²)
Concentration of Asbestos Structures \geq 5 μ m in length: ND (structures/mm²)
Total Concentration of Asbestos Structures ND (structures/cc)
Total Concentration of Asbestos Structures ND (structures/mm²)

Comments:


(Approved for Transmittal)

May 2, 1990
(Date)

This test report relates only to the specific items tested.



ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY
ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: WO-08-KI-DST

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: WG515

Received by: Beth Hiltbold
Analyzed by: Greg Hall

Date Received: 04/30/90
Date Analyzed: 05/03/90

Sample Type: DUST WIPE

QUALITATIVE ANALYSIS

A generous loading of dust was collected on a pre-wetted, 25 square centimeter section of a cleanroom wipe. The wipe was placed in a two ounce wide mouth collection vial and returned to the laboratory. Ten to fifteen milliliters of 0.2 micrometer filtered, deionized water was added to suspend the dust. The suspension was ultrasonically dispersed and the coarse fraction was allowed to settle. A drop of the suspension was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated for thermal stability in the electron beam and examined by transmission electron microscopy at 120 kilovolts accelerating voltage.

RESULTS

Chrysotile was detected in this sample. An energy dispersive spectrum (WG515.eds), a diffraction pattern (B811), and a micrograph (B812) were recorded.



(Approved for Transmittal)

May 3, 1990

(Date)

This test report relates only to the specific items tested.



ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY
ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: WO-08-BR-DST

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: WG516

Received by: Beth Hiltbold
Analyzed by: Greg Hall

Date Received: 04/30/90
Date Analyzed: 05/03/90

Sample Type: DUST WIPE

QUALITATIVE ANALYSIS

A generous loading of dust was collected on a pre-wetted, 25 square centimeter section of a cleanroom wipe. The wipe was placed in a two ounce wide mouth collection vial and returned to the laboratory. Ten to fifteen milliliters of 0.2 micrometer filtered, deionized water was added to suspend the dust. The suspension was ultrasonically dispersed and the coarse fraction was allowed to settle. A drop of the suspension was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated for thermal stability in the electron beam and examined by transmission electron microscopy at 120 kilovolts accelerating voltage.

RESULTS

Chrysotile was identified in this sample. An energy dispersive spectrum (WG516.eds) was recorded.


(Approved for Transmittal)

May 3, 1990
(Date)

This test report relates only to the specific items tested.



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AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY
ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: WO-08-BA-DST

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: WG517

Received by: Beth Hiltbold
Analyzed by: Greg Hall

Date Received: 04/30/90
Date Analyzed: 05/03/90

Sample Type: DUST WIPE

QUALITATIVE ANALYSIS

A generous loading of dust was collected on a pre-wetted, 25 square centimeter section of a cleanroom wipe. The wipe was placed in a two ounce wide mouth collection vial and returned to the laboratory. Ten to fifteen milliliters of 0.2 micrometer filtered, deionized water was added to suspend the dust. The suspension was ultrasonically dispersed and the coarse fraction was allowed to settle. A drop of the suspension was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated for thermal stability in the electron beam and examined by transmission electron microscopy at 120 kilovolts accelerating voltage.

RESULTS

Chrysotile was detected in this sample. An energy dispersive spectrum (WG517.eds) was recorded.


(Approved for Transmittal)

May 3, 1990
(Date)

This test report relates only to the specific items tested.



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AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY
ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: WO-08-LR-DST

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: WG514

Received by: Beth Hiltbold
Analyzed by: Barry Rayfield

Date Received: 04/30/90
Date Analyzed: 05/05/90

Sample Type: DUST WIPE

QUALITATIVE ANALYSIS

A generous loading of dust was collected on a pre-wetted, 25 square centimeter section of a cleanroom wipe. The wipe was placed in a two ounce wide mouth collection vial and returned to the laboratory. Ten to fifteen milliliters of 0.2 micrometer filtered, deionized water was added to suspend the dust. The suspension was ultrasonically dispersed and the coarse fraction was allowed to settle. A drop of the suspension was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated for thermal stability in the electron beam and examined by transmission electron microscopy at 120 kilovolts accelerating voltage.

RESULTS

No asbestos structures were detected.


(Approved for Transmittal)

May 3, 1990
(Date)

This test report relates only to the specific items tested.

APPENDIX C.1. FIELD DATA - TRANSFORMER EVALUATIONS

Second

like the

on
He
is A

6-3279
ILLINOIS

d me to

726-3315
wild

now status

schedule ns

10:00
09:00
firm

MARCH 09, 1990

SET-UP THE TWO CHICAGO SITES:

Tuesday MARCH 20 - WORTH 0930
WORTH

Account # GB78BE09233
Coordination Contact Mike Finnegan
(708) 396-3456

ADDISON
Scheduled MARCH 21 - 0930
Account # EU35 NA4540
Contact Bill Crutcher

Wants to
1 that the
so time
for PCB's
time

res down

organs, put

and the
2

on envelope

3-19-90

BUCKET TRUCK

Wilson Rentals

135TH & Cicero

- ARRIVED in Chicago AT 0830.

- SET UP Hotel

- RENTED BUCKET TRUCK-

Site.

and site

1312 - ARRIVED AT ADDISON SITE

- IDENTIFIED 4 potential Heavy
oil transformers. 3 in between
Army Trail Road & National Ave
& One in back of a House on
National Ave

- only one looks in decent shape

1003

1423 - Arrived AT WORTH site, Appears to
have 3 transformers most of which are
in very poor shape.

3-20-90

0930 - Arrived AT TITE SITE
- Con Ed Crews informed me that
the power to the entire installation
is off because they are working
on something else

0947 Approached 1st transformer which
is located in back of - between
houses 9 & 10

- Very poor condition (recommended not
to sample)
- STANDARD TRANSFORMER CO
37.5 KVA
S/N 147064
Type A

1000 Arrived 3 transformers in back
of House # 5, 2 are in very good
condition; the one in the middle is very poor
Sampled first one & INFO

GIE
S/N 9239594-654

- 10 KVA
- Access through inspection plate on top
- Sealed it when finished

in 1001
RECU:
Very
info
The S
S/N
Type
50

Sel T:
First one
SAMPLE

S/N

- TRANS.
- IS I
- IT IS
i Reso

Alex M
- let him
140

SAMPLE #
IL-53-PCB-d

appears to
which are

re that
installation
working

which
between

cannot not

back
very good
middle is very poor
SAMPLE #
L-53-PCB-d

plate on top

Middle One

RECOMMEND NOT TO SAMPLE
Very poor Condition
INFO:

The Standard Transformer Co
S/N 141733
Type A
50 kVA

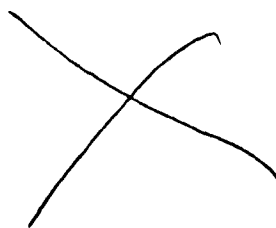
3rd Transformer same type as
first one - SAMPLED IT
SAMPLE # IL-53-PCB-02
INFO

GE
S/N G238586-657
10 kVA

- Transformer behind House #2
is inaccessible
- IT IS IN VERY POOR CONDITION
it resembles other two

Alex Muncie

- let him know what happened to
Housing Unit #
Addison - 52
Worth - 53



APPENDIX C.2. LABORATORY DATA - TRANSFORMER EVALUATIONS

WESTON Analytics - Dedicated Lab

CLIENT: USATHAMA-ANL
RFL # : 9004L939
W.O.# : 2104-13-01-0000

DATA QUALIFIER

1. The following qualifiers are used on the data summary:

U - Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).

J - Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

BS - Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD - Indicates blank spike duplicate.

MS - Indicates matrix spike.

MSD - Indicates matrix spike duplicate.

DL - Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.

NA - Not applicable.

DF - Dilution factor.

NR - Not required.

I - Interference.

Steph D. Neff

Project Director
Lionville Analytical Laboratory

4-13-70

DATE

Roy F. Weston, Inc. - Lionville Laboratory
 PCB ANALYTICAL DATA PACKAGE FOR
 USATHAMA-ANL

DATE RECEIVED: 04/02/90

RFW LOT # :9004L939

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
IL-53-PCB-01	001	OI	90DL0099	03/20/90	04/03/90	04/12/90
IL-53-PCB-02	002	OI	90DL0099	03/20/90	04/03/90	04/12/90

LAB QC:

PBLK	MB1	OI	90DL0099	N/A	04/03/90	04/11/90
PBLK	MB1 BS	OI	90DL0099	N/A	04/03/90	04/11/90
PBLK	MB2 BS	OI	90DL0099	N/A	04/03/90	04/11/90
PBLK	MB2 BSD	OI	90DL0099	N/A	04/03/90	04/11/90

RFW Batch Number: 9004L939

Client: USATHAMA-ANL

PCBs by GC

LABORATORY

Report Date: 04/12/90 11:27

Work Order: 2104-13-01-0000

Page: 1

Cust ID: IL-53-PCB-01 IL-53-PCB-02

Sample
InformationRFM#:
Matrix:
D.F.:
Units:001
Oil
5.00
ug/g002
Oil
5.00
ug/g900L0099-NB1
Oil
5.00
ug/g900L0099-NB1
Oil
5.00
ug/g900L0099-NB2
Oil
5.00
ug/g900L0099-NB2
Oil
5.00
ug/g

PBLK BSD

PBLK BS

PBLK BS

PBLK

PBLK BS

PBLK BS

PBLK BS

PBLK BS

PBLK BS

Aroclor-1016

Aroclor-1221

Aroclor-1232

Aroclor-1242

Aroclor-1248

Aroclor-1254

Aroclor-1260

3.0 U

3.0 U

3.0 U

3.0 U

3.0 U

6.0 U

3.0 U

3.0 U

3.0 U

3.0 U

3.0 U

6.0 U

3.0 U

3.0 U

3.0 U

3.0 U

3.0 U

6.0 U

3.0 U

3.0 U

3.0 U

3.0 U

3.0 U

6.0 U

3.0 U

3.0 U

3.0 U

3.0 U

3.0 U

112 %

3.0 U

3.0 U

3.0 U

3.0 U

3.0 U

120 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
 %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC